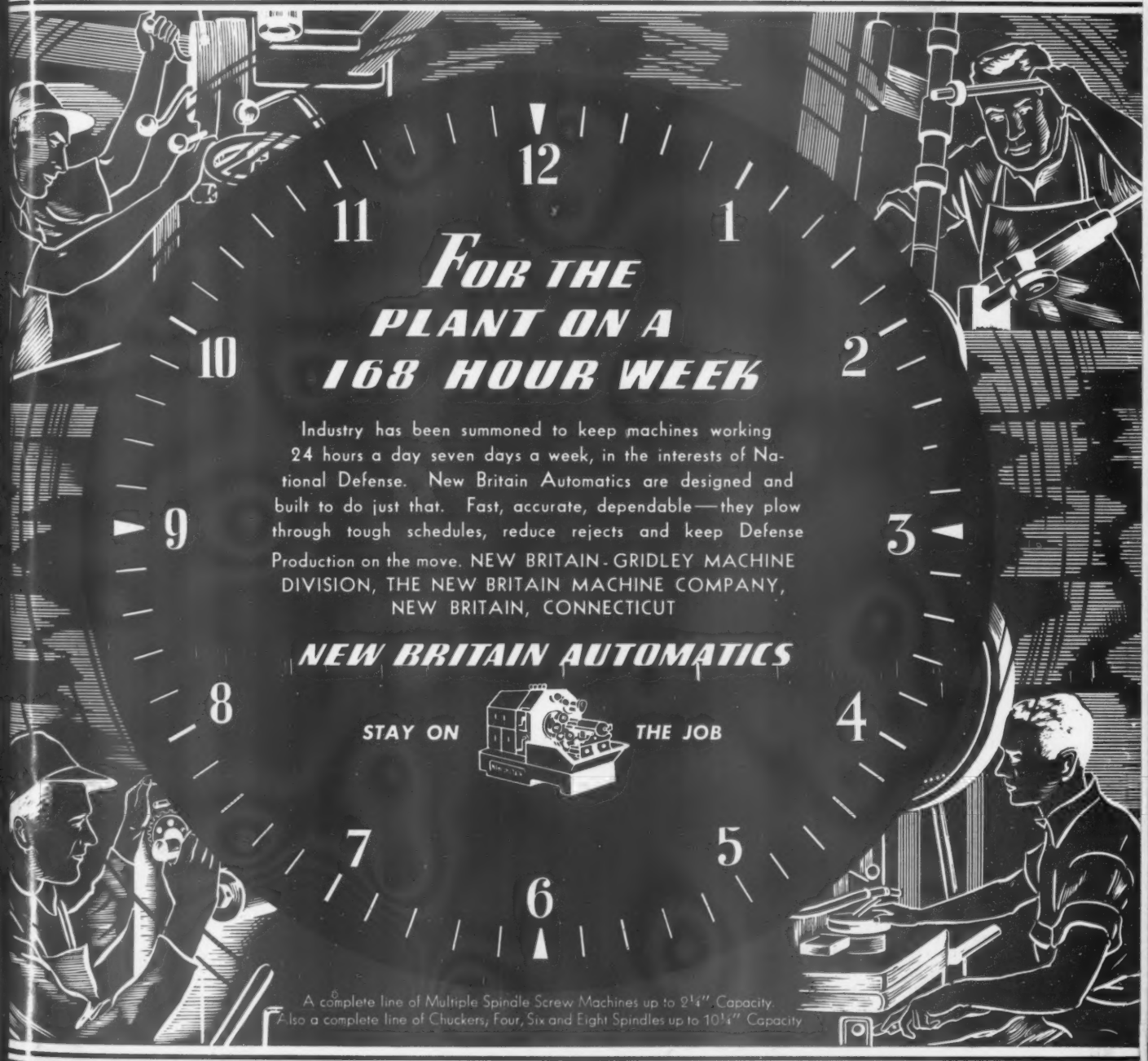
The
TOOL ENGINEER
MACHINERY • PRODUCTION • TOOLS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FOR THE PLANT ON A 168 HOUR WEEK
Industry has been summoned to keep machines working 24 hours a day seven days a week, in the interests of National Defense. New Britain Automatics are designed and built to do just that. Fast, accurate, dependable—they plow through tough schedules, reduce rejects and keep Defense Production on the move. NEW BRITAIN-GRIDLEY MACHINE DIVISION, THE NEW BRITAIN MACHINE COMPANY, NEW BRITAIN, CONNECTICUT
NEW BRITAIN AUTOMATICS
STAY ON
THE JOB
A complete line of Multiple Spindle Screw Machines up to 2¼" Capacity.
Also a complete line of Chuckers, Four, Six and Eight Spindles up to 10¼" Capacity

This is a typical magnesium part for an airplane engine . . . accurately machined, light and strong. National defense programs include many such magnesium parts . . . in large quantities.

Here is what our experts have worked out

PERHAPS yours is one of the many shops that soon will be doing unfamiliar work in the national defense program. If you've never machined magnesium, here are some cutting tool facts that will help.

Magnesium cuts very freely . . . more so than any other structural metal . . . but it carries a fire hazard. That is why some of the metal parts in an airplane burn up when things go wrong. Because of this your cutting tools must be kept sharp and have extra smooth cutting surfaces to reduce friction. Ordinary precautions will offset the fire hazard . . . but remember the chips will burn.

You can machine magnesium dry with good results, but most recent practice uses a mixture of kerosene with either lard oil or mineral oil. This will assure cooling, produce a smoother finish, and offset distortion on thin pieces. Speeds and feeds are high—approaching those used in woodworking.

Ample chip room is essential in all tools cutting magnesium. For example a milling cutter only has half as many teeth as a cutter made for steel. You can convert a cutter by grinding out every other tooth and altering the angles . . . but be sure to smooth it up to reduce chip friction.

High rake angles work best, along with excessively high peripheral clearances . . . more than double ordinary practice. Use as much as 20° rake on milling cutters . . . 15° on taps.

Tools like taps and reamers usually are made slightly larger than those used on other materials, because magnesium seems to "hug" the tool—cutting close to size. This increase is from 3 to 4 ten-thousandths on reamers and up to .0005″ on taps.

If you have special cutting tool problems, never hesitate to ask a PRATT & WHITNEY sales engineer for help. We stand ready to do everything possible to aid our friends and do our full part in speeding up national defense.

We've been making cutting tools for 80 years and our experience and knowledge is yours for the asking. Write to PRATT & WHITNEY, *Division Niles-Bement-Pond Company*, WEST HARTFORD, CONNECTICUT, U.S.A.

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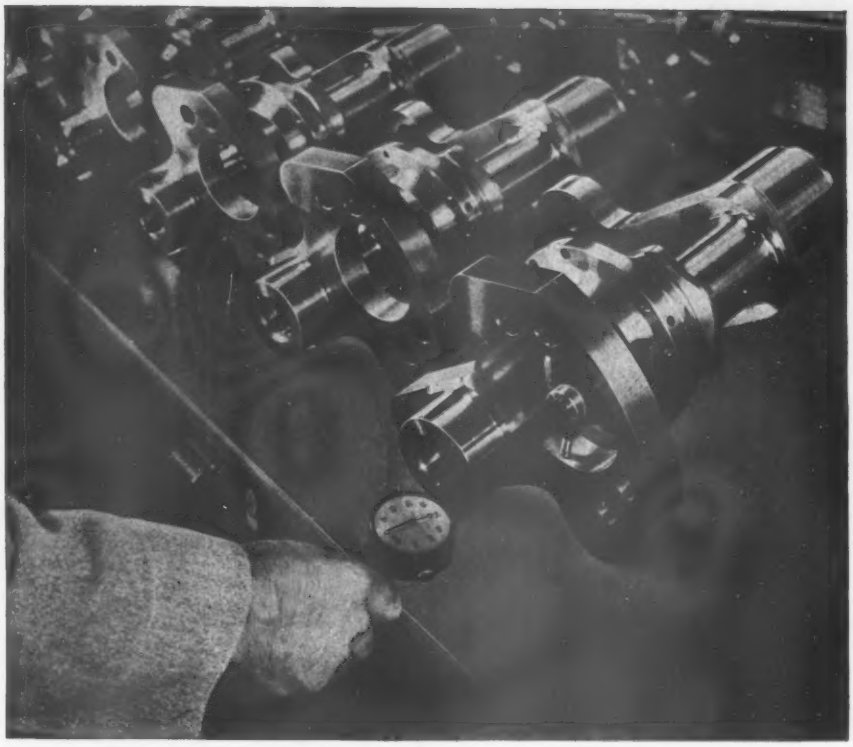
ONE OF A SERIES TO MAKE PRATT & WHITNEY RESEARCH AVAILABLE TO AMERICAN SHOPS



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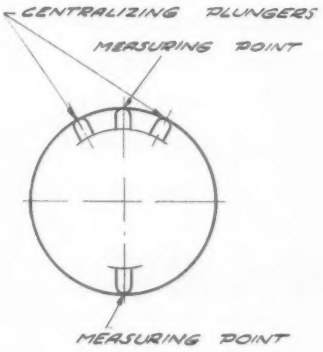
Dial Bore Gages

are available in five sizes to take care of diameters from 1" to 12".



Accuracy and sensitivity are in keeping with the most exacting demands of precise production, as illustrated above in the checking of damper liner bores in aero-engine crankshafts.

Sturdily built for hard shop use.

Special adaptations on request.

Apply for circular.

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1—INCREASED STRENGTH.

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3—CONTINUOUS UNBROKEN FIBRES.

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7—CONTINUOUS FIBRES ENDING IN SOCKET WALLS.

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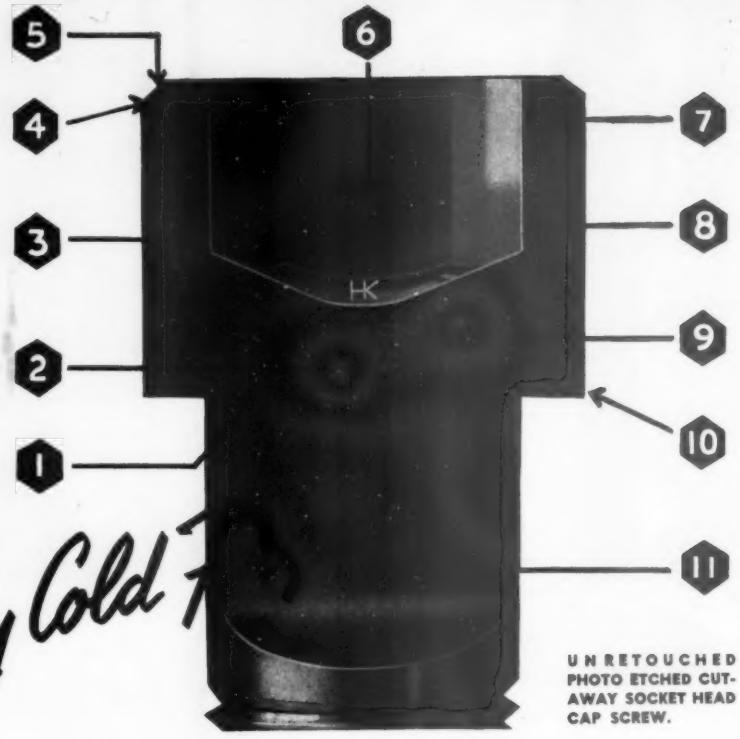
9—CONTINUOUS UNCUT FIBRES.

10—SQUARE SHOULDERS.

11—ORIGINAL CONTINUOUS FIBROUS STRUCTURE.



Completely Cold F

UNRETOUCHED PHOTO ETCHED CUTAWAY SOCKET HEAD CAP SCREW.

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Guaranteed Unfailing Performance from every single Holo-Krome Screw . . . This Unfailing Performance is made possible by the Quality and Precision Features inherent in these Completely Cold Forged Screws, due to the Superior Method (patented and exclusively used by Holo-Krome) employed in the manufacture of Holo-Krome FIBRO FORGED Screws.

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THE TOOL ENGINEER

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IGOR SIKORSKY

The name of Sikorsky is almost synonymous with aviation, so much has its bearer accomplished in the field from the earliest days. He has always been particularly interested in the possibilities of direct lift aircraft and writes in this article (p. 37) upon a subject he knows from the ground up.

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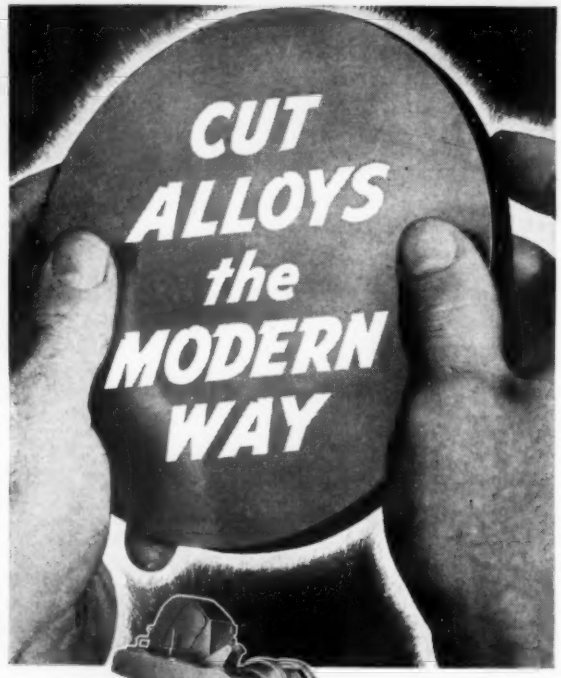

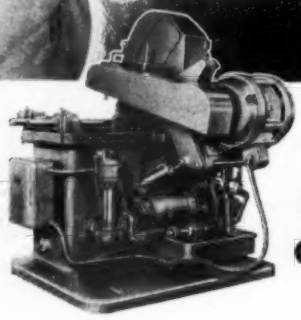

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For example: The Campbell CUTAMATIC cuts the 6-inch round illustrated above more accurately and in much less time. Cuts annealed or unannealed stock.

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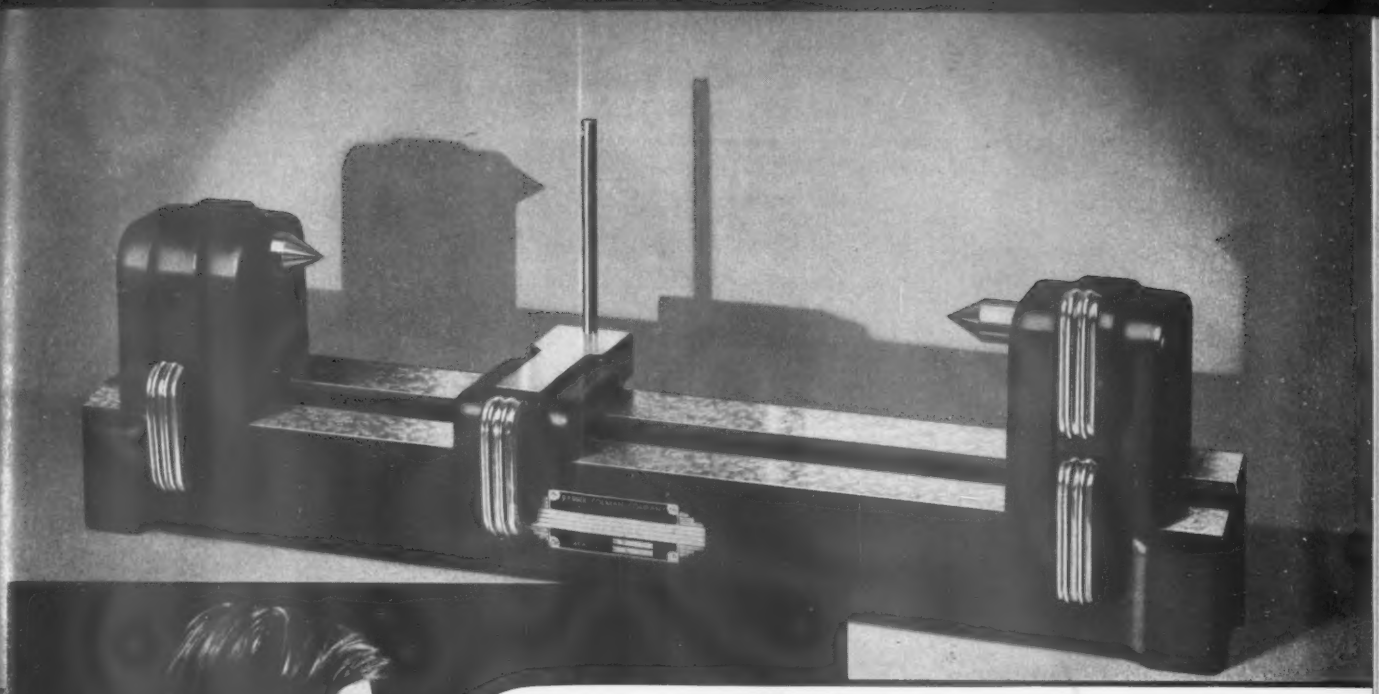

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This new, improved Barber-Colman Bench Center is a real time saver on inspection work. It combines modern streamlined appearance with speed of operation and accuracy, including such features as:

- Quick-acting lever on the spring loaded tail center which unclamps and retracts the center in one motion.
- Improved design of ways locating all three sliding members from one surface.
- New type clamping which locks the slides and centers rigidly to the ways, and when unclamped insures free sliding action.
- Extra large centers held in sturdy box-type heads assure rigid work support and a long, accurate life.

These advantages make the Barber-Colman Bench Center an unexcelled tool for checking runout, "camming" action or straightness in a wide variety of work up to 6½" dia. by 18½" long, that can be mounted between centers.

Perhaps there are jobs in your plant where this modern streamlined bench center will speed and improve inspections economically. A limited stock is available for immediate delivery. Price $75.00 F.O.B. Rockford, Ill.

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Capacity — Maximum distance between centers	18½"
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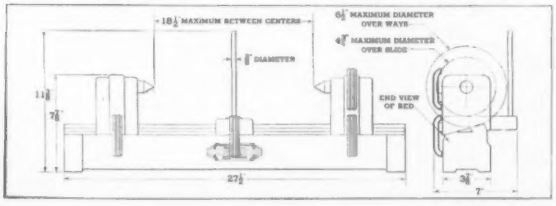
Capacity — Diameter of work over indicator slide	4¾"
Length of bed	27½"
Net weight	53 lbs.
Approx. shipping weight, boxed	90 lbs.
Dimensions of shipping box,	31½" x 10" x 11"



- Barber-Colman Bench Center Bulletin No. 1201-2 gives full description. Your copy will be sent promptly upon request.

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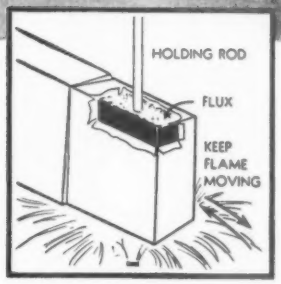
Specify Carboloy STANDARD STOCK Blanks

For emergency tooling, keep a stock of Carboloy Standard Blanks in your tool crib . . . ready, on a moment's notice, to make up a tool and have it on the job *fast!*

Here's all that's necessary to do the job: (1) your regular tool room equipment for milling (or grinding) recess in shanks; (2) a torch; (3) a few inexpensive accessories: Silver solder, flux, carbon tetrachloride, etc.; (4) your regular carbide tool grinding equipment.

Illustrated above are a few of the many Carboloy tools used by a well-known brass goods manufacturer. They range from complicated forms to the most simple types. All are regularly made in their own shop. The method is simple, economical, fast!

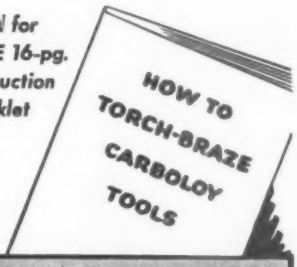
Complete instructions on how to make your own Carboloy tools are contained in our Engineering Bulletin GT-116 available upon request, without obligation. Investigate this "short-cut to speed-up."—Write for your copy today.



EASY TO BRAZE!

You can braze a ⅝ x 1¼ tool, for example, in less than 5 minutes, and get it on the job FAST!

Send for FREE 16-pg. instruction booklet



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● How long these armatures deliver efficient service will depend largely upon their proper static and dynamic balance. For, in any high-speed rotating part—from diesel locomotive generators to the tiny rotor in your electric razor—unbalance means vibration, excessive wear, and shorter life. The best "insurance" against it is proper balance.

This fact has long been known to manufacturers. But until recently, accurate balancing was a costly, time-consuming operation. Now, the new Gisholt Balancing Machines enable you quickly to locate and measure unbalance in terms of practical "correction units." It's all done in a few seconds—detecting unbalance vibrations as small as .000025".

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MORE FIRTHITE TOOL TIPS!

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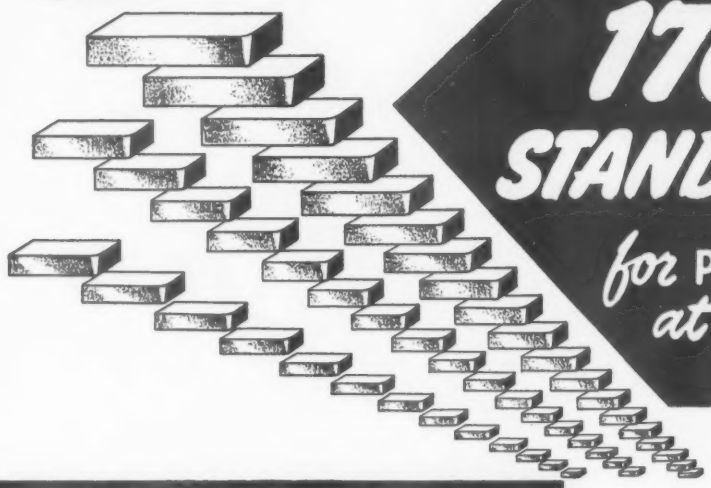
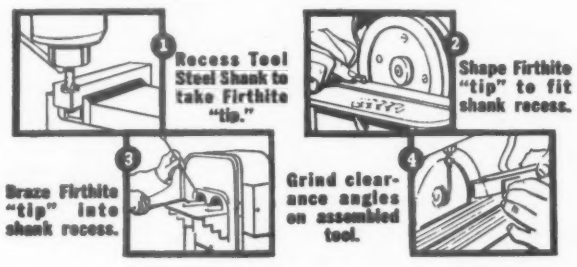


176 NEW STANDARD SIZES

for PROMPT DELIVERY at LOWER PRICES

MAKE YOUR OWN FIRTHITE CARBIDE TOOLS!

Don't slow up production for lack of enough Cutting Tools. Join the increasing group of manufacturers who make their own FIRTHITE Tools from Standard FIRTHITE Tips. Only FOUR basic steps are required to make these superior tools *in your own shop.* Information on request.



We have added 176 NEW Standard Sizes to the FIRTHITE line of Carbide TIPS for making your own Cutting Tools. Increased production facilities assure *prompt* delivery of all *standard* tips and special low prices. FIRTHITE Standard Tips now embrace almost the whole field of single point tool requirements and will fit a wide variety of special tools. Sizes range from 1/16"x5/32"x1/4" up to and including 1/2"x3/4"x1 1/4" in styles and grades to meet your needs.

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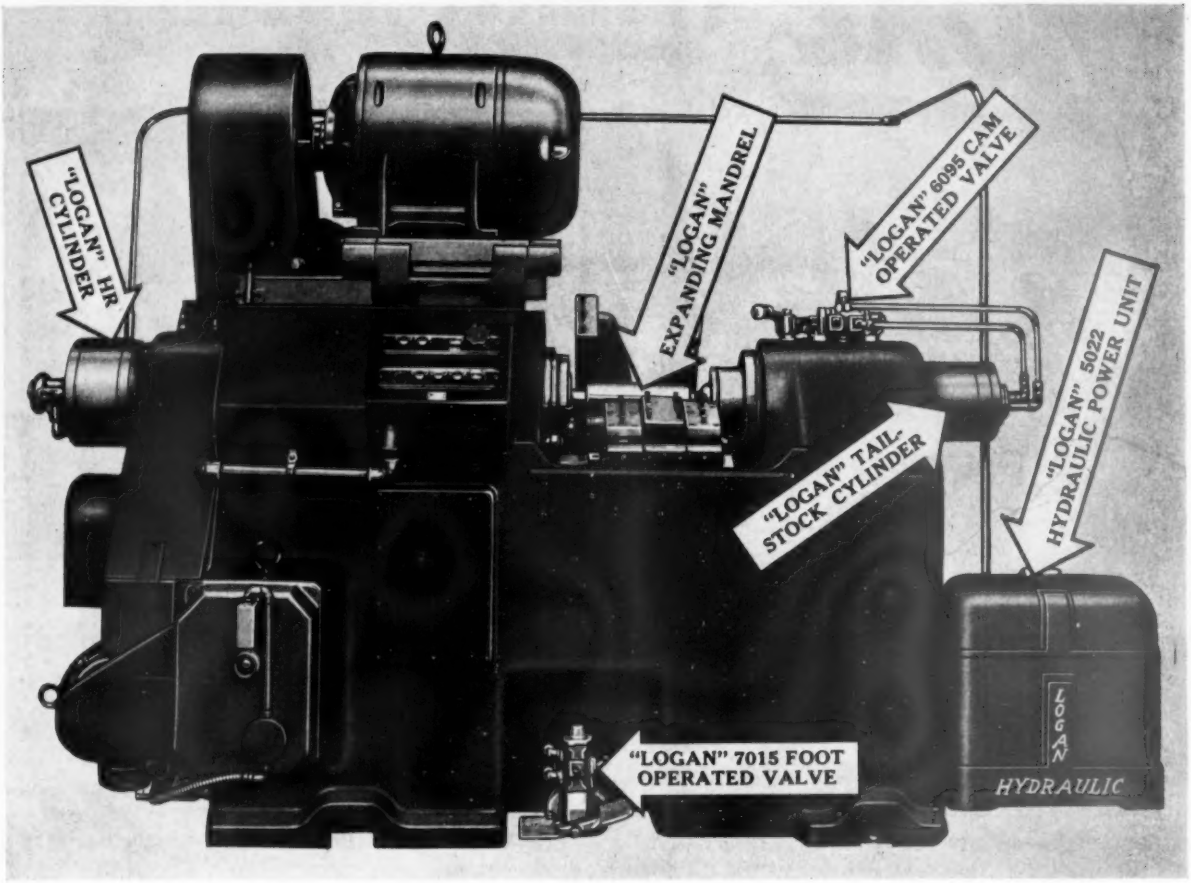

AS APPLIED TO SHELL TURNING LATHE

The above illustrates an excellent example of hydraulic chucking as used for shell turning operations. The Expanding Mandrel and Tailstock are operated by Hydraulic Cylinders with adjustable pressures. Individual small Power Units for each machine, or a large Power Unit with Accumulator capacity for a multiple of machines, are available. Let "LOGAN" Representatives and "LOGAN" Engineers make recommendations on your shell turning problems.

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902 PAYSON ROAD, LOGANSPORT, INDIANA

Manufacturers of Air and Hydraulic Devices, Chucks, Cylinders, Valves, Presses and Accessories

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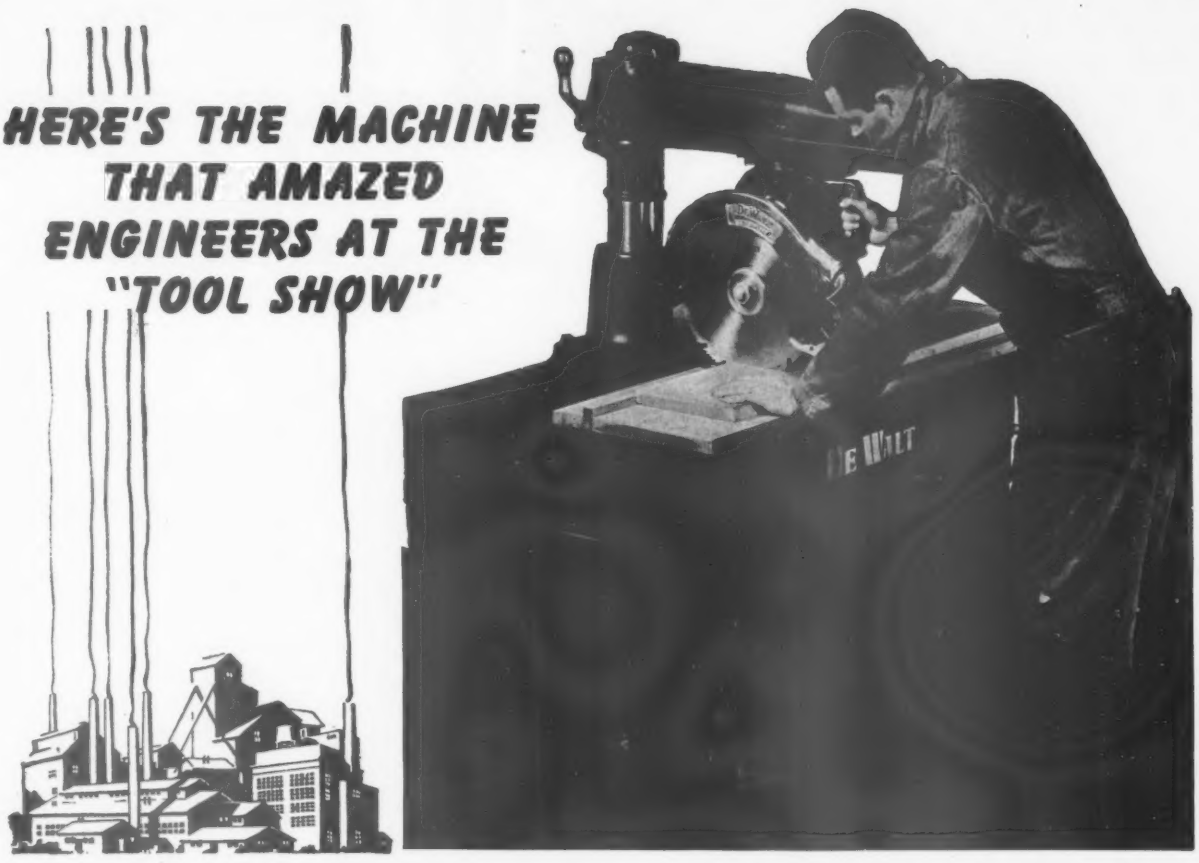


It's built to keep on paying profits on jobs like these in any plant

CARPENTER SHOP

One DeWalt does the work and earns the profits of many machines. It expertly handles all kinds of maintenance work.

PATTERN SHOP

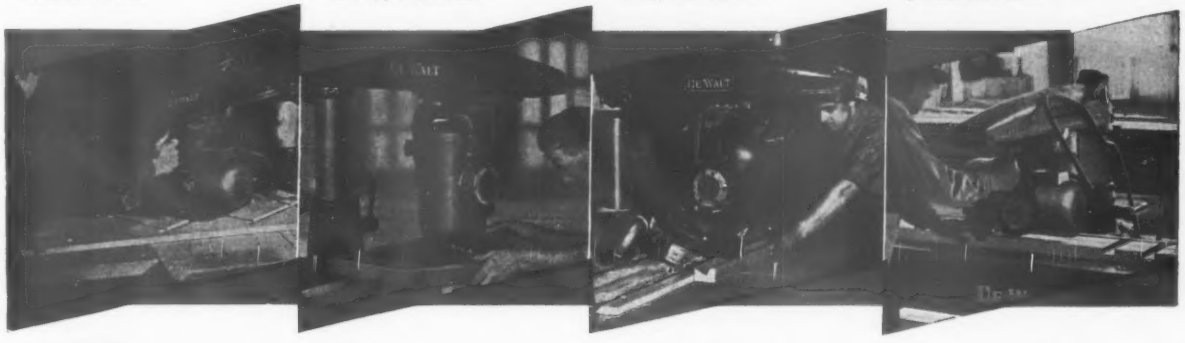
The most complicated patterns you have are no problem to the DeWalt. It makes every cut desired with the accuracy expected.

CRATING SHOP

DeWalt is the fastest machine you can get for straight cut-off and rip in building standard or special crates, cases, boxes, etc.

PRODUCTION LINE

DeWalt is engineered and built to handle peak volumes on any operation. It's a dependable machine on any production line.

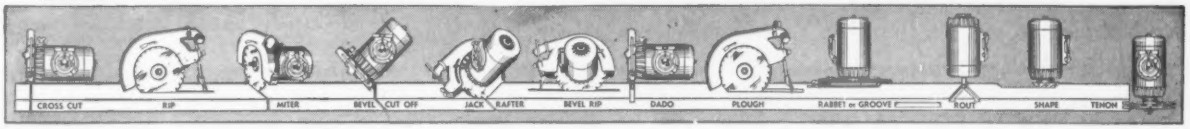


Free BOOKLET

WIRE, WRITE OR PHONE . . .

DEWALT PRODUCTS CORPORATION
706 Fountain Avenue, Lancaster, Pa., U.S.A.

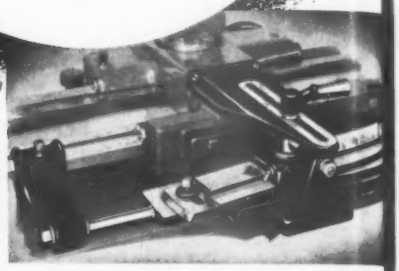
ONE DEWALT GIVES YOU ANY CUT YOU WANT — WHEN YOU WANT IT!



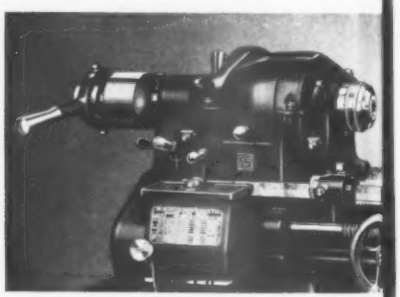
SOUTH BEND LATHES

REDUCE COSTS
•
INCREASE ACCURACY
•
PROVIDE GREATER VERSATILITY
•

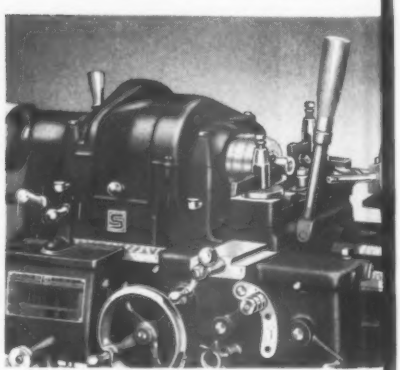
SOUTH BEND 10" SWING, 1" COLLET CAPACITY
TOOL ROOM PRECISION BENCH LATHE



TELESCOPIC TAPER ATTACHMENT
Turns and bores tapers up to 3¼ inches per foot smoothly, easily, accurately. Telescopic feature eliminates disconnecting cross feed screw when taper attachment is in use.



HAND LEVER DRAW-IN COLLET CHUCK
For rapid production of small parts from bar stock or tubing. Stock is released and fed through collet without stopping spindle.



HAND LEVER DOUBLE TOOL REST
Permits using front and back cutting tools on lathe carriage. Has adjustable stops for regulating depth of cut for each tool. May be operated by hand lever or cross feed screw.

MODERN in design, built with extreme precision, South Bend Lathes are fast—accurate—versatile. They have high spindle speeds and rigidity essential for efficient machining with carbide or diamond tipped tools. They are capable of finish turning or boring with such precision that subsequent grinding, honing or lapping operations are often eliminated. And they have plenty of power for roughing cuts.

Features responsible for the excellent performance of South Bend Lathes include an alloy steel spindle with hardened and superfinished bearing surfaces, one piece double wall apron with steel gears running in oil, a powerful worm drive and multiple disc friction clutch operating carriage feeds, and a direct belt drive to spindle.

South Bend Lathes are made in five sizes: 9″, 10″, 13″, 14½″ and 16″ swing, 3′ to 12′ bed lengths, in Tool Room or Manufacturing types, with countershaft drive or motor drive. Write today for a catalog and the name of your nearest dealer.

SOUTH BEND LATHE WORKS

479 EAST MADISON STREET, SOUTH BEND, INDIANA, U. S. A.

LATHE BUILDERS SINCE 1906

WE FAVOR ADEQUATE PREPAREDNESS FOR NATIONAL DEFENSE

Under the urgent pressure of emergency, more industries have changed over to Vascoloy-Ramet Tools than ever before.

Only one factor could possibly cause this remarkable increase—and that factor is QUALITY.

Previous performance records for machining cast iron, non-ferrous metals and steel look like ancient history when compared with 1941 Vascoloy-Ramet Tool performance.

With Vascoloy-Ramet Tools properly selected and applied you can be sure of maximum machine production in terms of pieces per grind, per tool, per machine and per dollar.

Call in a Vascoloy-Ramet factory representative or authorized agent today.

VASCOLOY-RAMET CORPORATION

NORTH CHICAGO, ILLINOIS

An affiliate of

FANSTEEL METALLURGICAL CORPORATION

and

VANADIUM-ALLOYS STEEL COMPANY

Factory-Owned Branches: Jersey City . . . Detroit . . . Cleveland . . . Buffalo . . . Syracuse . . . Pittsburgh . . . Cincinnati . . . Hartford . . . Providence . . . Philadelphia . . . St. Louis . . . Milwaukee

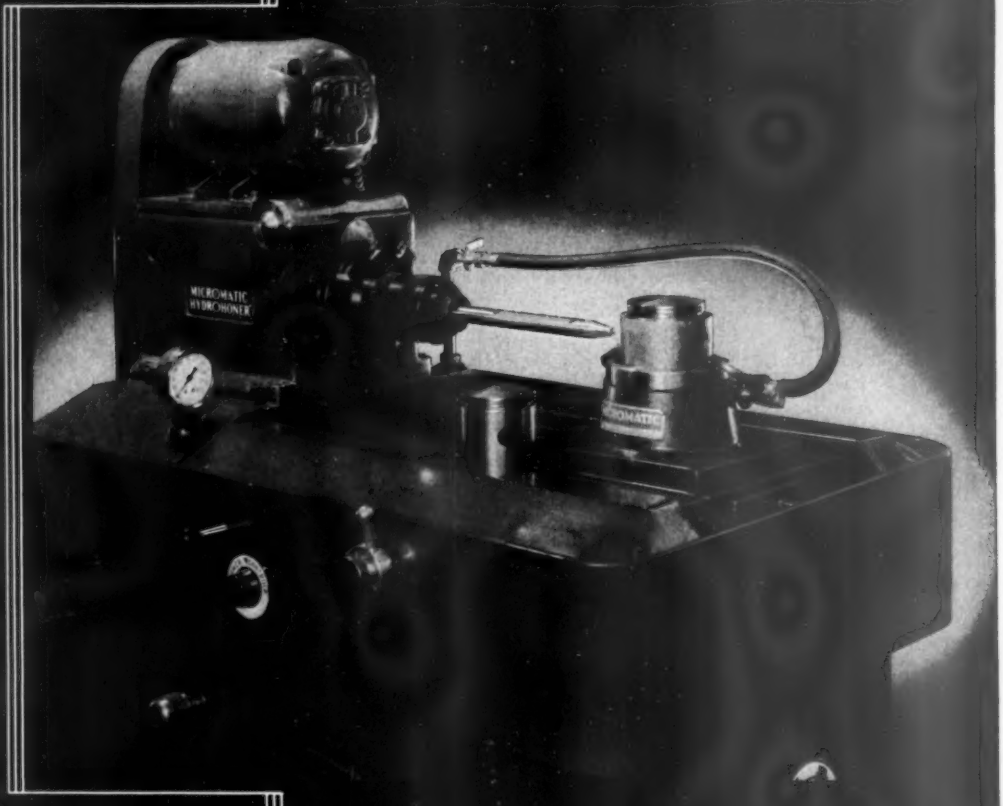
AUTHORIZED AGENTS IN PRINCIPAL CITIES

In Canada: Carbide Tool & Die Company, Ltd., Hamilton, Ont.

THE SUPERIOR TANTALUM-TUNGSTEN CARBIDE TOOLS

New

Automatic
MICRO SIZE
Control
WITH
MICROMATIC HYDROHONER



For the first time in honing, this equipment makes completely automatic operation successful.

The Automatic Micr-O-Size Control Unit generates accurate sizing in high production, uniformly within limits from .0002" to .0005", reducing tolerance range and number of selective fits.

It offers increased production through simplified practice. Write for Bulletin A.R.-60.

MICROMATIC HONE CORPORATION
1345 East Milwaukee Ave.
DETROIT, MICHIGAN

DON'T LAY OUT A BROACHING PROGRAM-

Without all the facts up to Last Night

Broaching practice, because of its importance in high production work, is developing faster than other phases of machining and faster, in fact, than its record is being written. Consequently, up-to-the-minute experience is vital to both speed and economy.

For instance, do you appreciate the savings in time and tool cost being made by the Red Ring Double Jump Broach (patented)?

Do you know the possibilities of the Red Ring method of multiple involute splines for universal joints and other machine elements, the operation of which demands a minimum of backlash or which must be designed with a high ratio of strength per unit of weight?

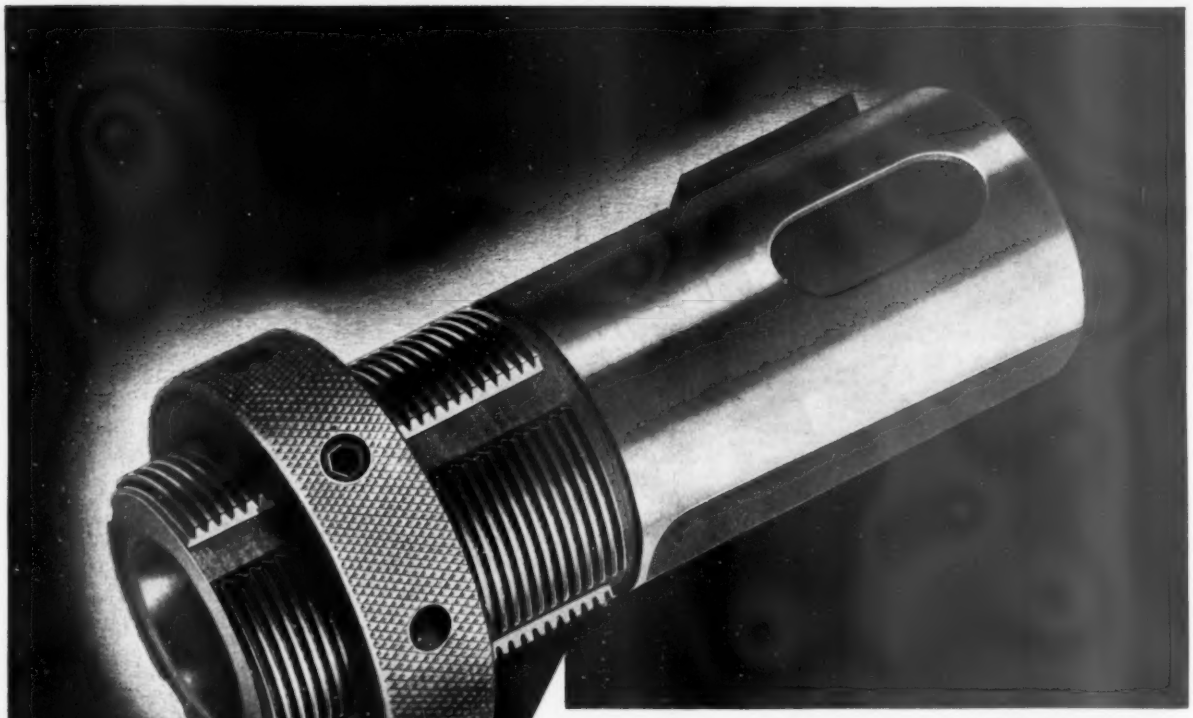
Are you familiar with what is being accomplished by Naloy tools in the field of hard gear broaching?

Do you know what Naloy steel for broaches and [illegible] tools is saving its users?

Today's defense program demands the ultimat[illegible]ed, quality and economy. Where broaching or [illegible]ool cutting is under consideration, consult Nati[illegible]oach engineers for the last word in modern p[illegible]

NATIONAL BROACH AND MACHINE CO.

5600 ST. JEAN • DETROIT, MICHIGAN



QUICK • ACCURATE ADJUSTMENT

ADJUSTABLE ADAPTER ASSEMBLY

This tool developed for the Automotive Manufacturers is now accepted and used by Drilling Machine Manufacturers and Production Plants. These adapters are furnished with an Acme or Standard V Thread ground on the outside diameter, furnishing a bearing on the front end of the adapter.

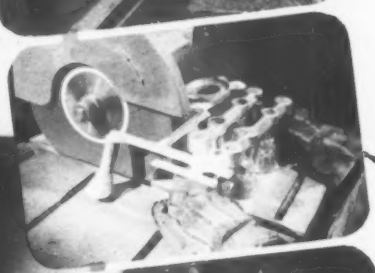
SCULLY-JONES & COMPANY
1907 South Rockwell St. ∴ ∴ Chicago, Illinois

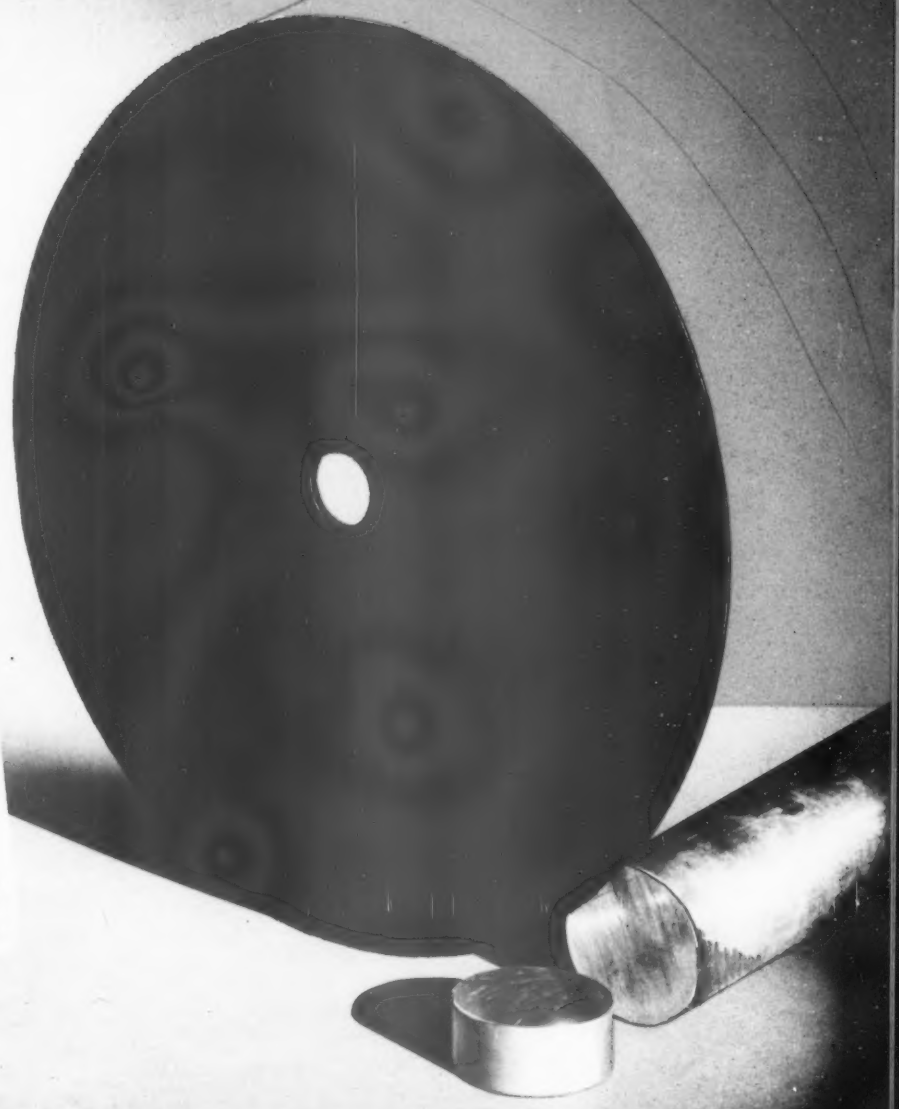
TAKE ADVANTAGE OF CUT-OFF WHEELS

Their Speed and Economy on Metals and Non-metals

ABRASIVE wheel cutting-off is the modern way of speeding up operations and lowering cutting-off costs. Norton provides complete cut-off service—Resinoid, Rubber and Shellac bonds; Alundum and Crystolon abrasives.

Because Norton engineers have three bonds and two types of abrasives to work with they can give unbiased assistance on all types of cutting-off jobs—metallic or non-metallic materials by dry, wet or submerged methods.





NORTON ABRASIVES

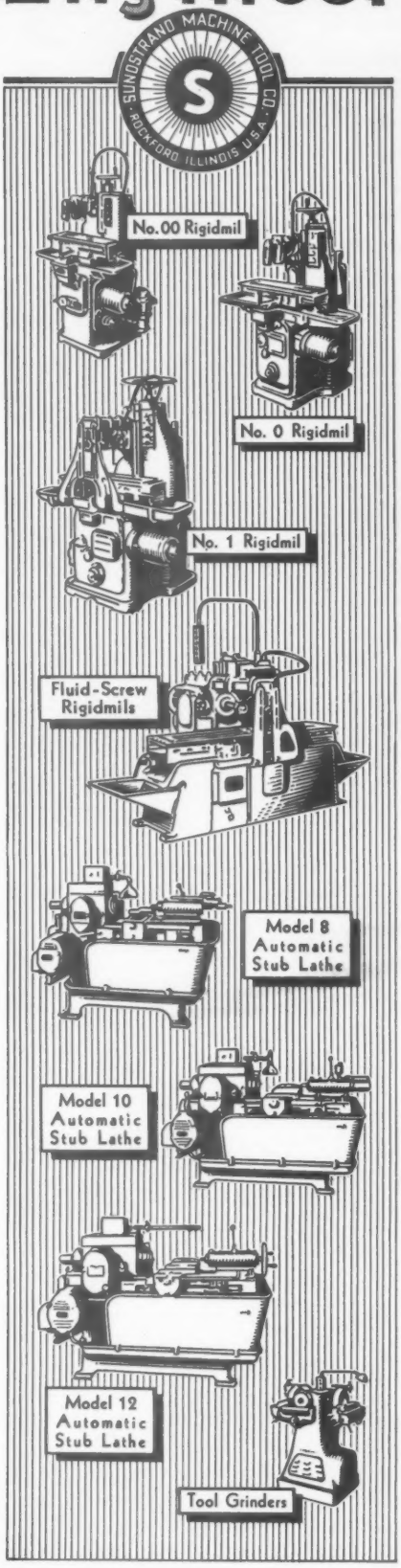
Why Operators Like "NORTON RESINOID" Wheels for Portable Grinders

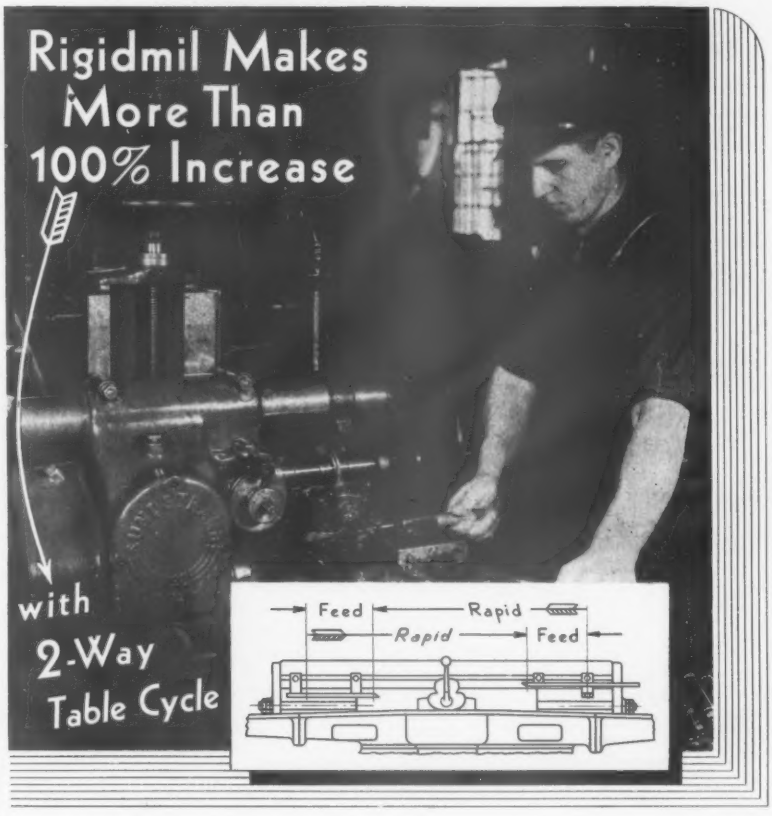
THEY like their fast cutting action (due to the hardness and sharpness of the Norton abrasive) • They like the way the wheels seem to hug the work (laboratory developed formulae give just the right amount of bond resiliency) • They like the freedom from vibration which means less fatigue at the end of the day. (Perfection of balance is built into Norton portable wheels by rigid control in manufacture) • They like the way that Norton engineering service selects just the grains, grades and structures needed for their particular jobs.

NORTON COMPANY, WORCESTER, MASS.

NORTON ABRASIVES

Engineered Production...





★ When you want greater output on milling and turning, use Sundstrand Engineered Production. This service develops for you the best applications of unique qualities which make Sundstrand Rigidmils and Stub Lathes highly efficient, adaptable, and economical.

For Example . . . The milling job shown above was formerly done in two separate hand-feed operations of form milling and slotting. Now the two operations are combined, and duplicate fixtures at opposite ends of the Rigidmil table are used. The 2-way automatic hydraulic table cycle may run continuously, as diagrammed; or stop at any point as required. Production is more than doubled, labor and work-handling are reduced more than half . . . and 100 other milling operations are also handled on this Rigidmil.

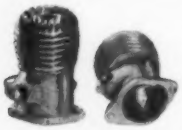
At Your Service . . . Engineered Production data and experience, acquired in developing hundreds of highly successful Rigidmil and Stub Lathe installations are at your service for saving time and labor on milling and turning. Get your official priority, use Sundstrand Engineered Production, and place your orders *now*.

SUNDSTRAND MACHINE TOOL CO.
2532 Eleventh Street, Rockford, Illinois, U. S. A.

RIGIDMILS • STUB LATHES

Hydraulic Operating Equipment — Centering Machines — Tool Grinders

SUNNEN PRECISION HONING MACHINE



Miniature Model Airplane Cylinders "Eliminates expensive machine set-up."

Stone Lettering Air Hammer "Sunnen honing does in five minutes what it took 20 minutes to do by lapping."

"Produced an extremely accurate and glass-like finish."

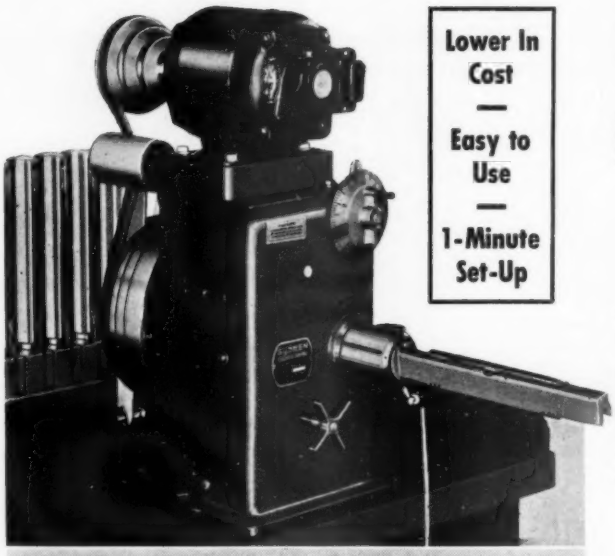
Diesel Engine Fuel Injector Cylinder "So accurate that a piston can be fit within .00005 inch."

"A perfectly straight round hole with a mirror finish."

Drill Jig Bushing "Increases sales appeal of product."

"Strict alignment maintained between two holes."

Hardened Steel Ring Gauge. A number of manufacturers making gauges are using the Sunnen Precision Honing Machine as a method of finishing. Gauges are finished to an accuracy of .000025 inch limit for roundness and straightness.



Lower In Cost — Easy to Use — 1-Minute Set-Up

Production Increased 500%

A manufacturer of an eight hole valve manifold was lapping the holes and spending two hours' time on each job. The Sunnen Precision Honing Machine now does the job in 20 minutes — an *increase* in production of 500% over the old method. And in addition this manufacturer is now able to produce every hole exactly the same size.

Solves 5 Problems

The Sunnen Precision Honing Machine solves these 5 internal grinding and finishing problems:

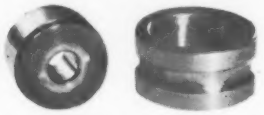
1. **Corrects errors of out-of-round and taper produced by previous operation.**
2. **Produces super-smooth surface finishes.**
3. **Accurately finishes holes to very close tolerance as to size and straightness.**
4. **Maintains alignment already established by previous operations.**
5. **Provides a simple, low cost production method for accurately duplicating sizes.**

Hundreds of manufacturers have found that they can increase production on internal finishing operations with the Precision Hone, and at the same time get a better surface with closer tolerances than by any other method.

The Sunnen Precision Hone will handle any size hole from .185" to 2.400" in diameter, in any metal except lead or babbitt.

Have you an internal grinding or finishing problem? A Sales Engineer will be glad to call and demonstrate this machine in your plant. Write for Free 8-page bulletin.

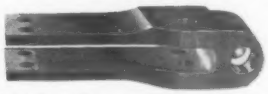
SUNNEN



Drawing and Blanking Die "Saves time in producing smooth base metal finish."

Inner Bearing Ring "Accurately removes last 'tenth' of stock."

Bronze Valve. The Sunnen method of honing is used to secure a high finish and accuracy.



Mild Steel Clevis. Honing was used to correct errors of previous machining and maintain true alignment of the two bearing surfaces of this clevis.

Hardened Steel Gears. Honing used to remove any distortion after hardening and to selectively size the gears to uniform diameters.

Molded Composition (Bakelite) Pulleys. Molded composition is a difficult material to machine but it can be easily honed to a smooth finish.

Aviation Hydraulic Cylinder made of Aluminum-Alloy. Improving the quality of the bearing surface they contact. An extremely smooth surface-finish was secured.

Honing was used to correct errors of previous machining operations and to obtain a highly-polished surface finish.

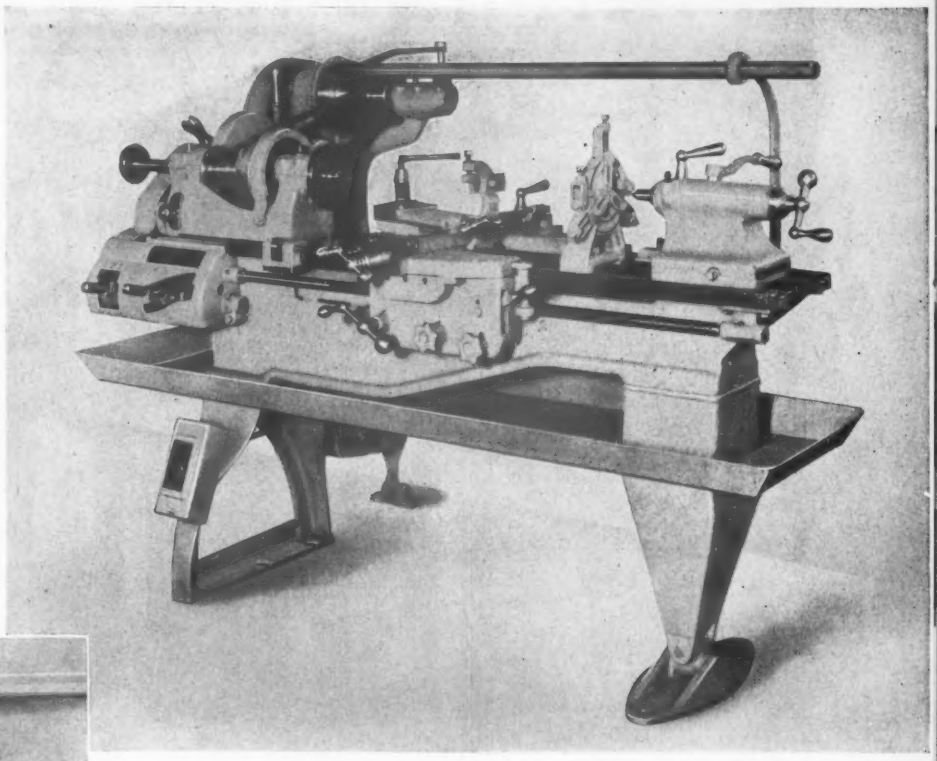
Hardened Steel Parts. Honing is used to remove burrs caused by the flash of a punch press operation.

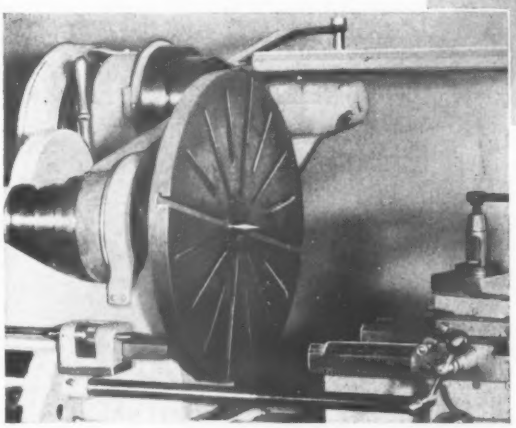
SUNNEN PRODUCTS CO. 7932 Manchester Ave., St. Louis, Mo. • Canadian Factory, Chatham, Ont.

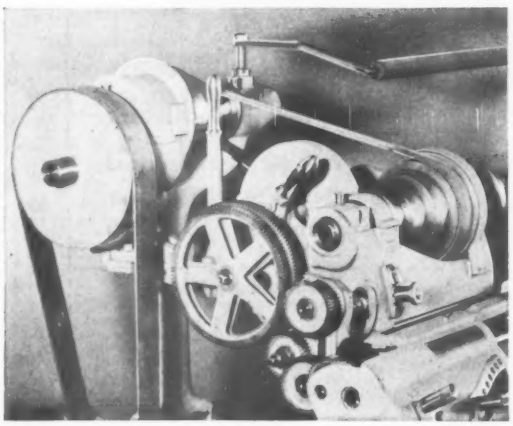
MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-swing PEOPLE" SENECA FALLS, NEW YORK

STAR LATHE EQUIPPED FOR MOBILE SERVICE







Problem: To provide a light weight engine lathe capable of handling work with large diameter flanges, and suitable for mounting on a truck for mobile service.

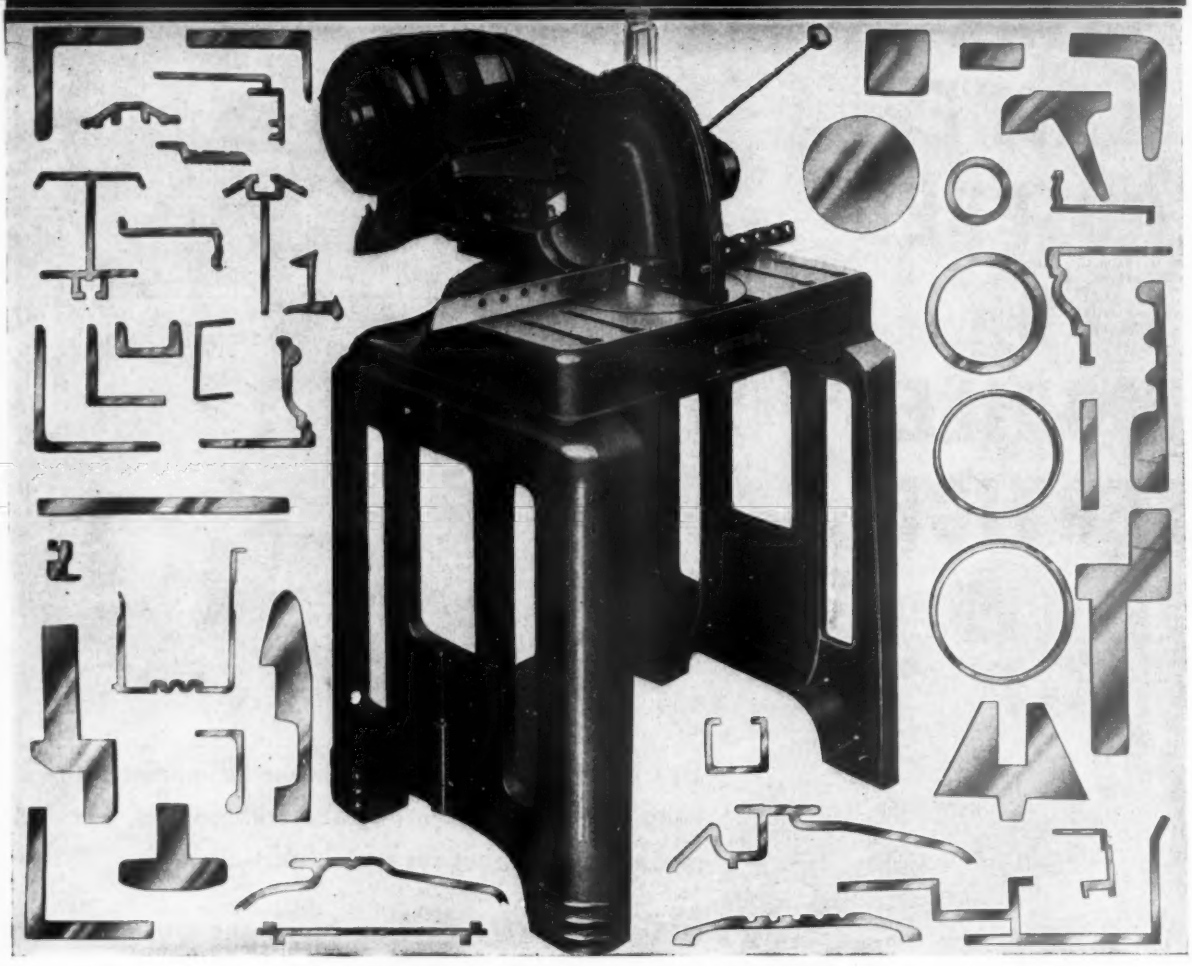
Solution: A standard 14" Star Lathe with removable gap was selected for this job. All equipment and accessories are standard, with the exception of the motor drive which is given additional support and protection against road shocks by a specially-designed floor leg. A leg of special type, likewise, supports the tailstock end of the lathe. It is so designed that the unavoidable twisting and weaving of the truck platform cannot distort the lathe bed or in any way throw the lathe itself out of proper alignment.

Left, top: Close-up view of lathe with gap removed and 22" face plate in place.

Left, opposite: View of headstock end, with belt and gear guards removed, showing transposing gears for cutting metric threads.

LATHE NEWS from SENECA FALLS

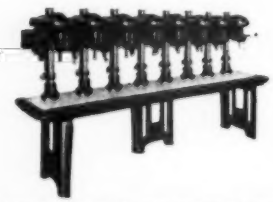
New Cut-Off Machine for Non-Ferrous Metals



New DELTA Machine Cuts Non-Ferrous Metals with POLISHED SMOOTHNESS

The photograph above shows some of the actual shapes and sizes handled by the new Delta Cut-Off Machine. This remarkable unit is designed especially for cutting copper, brass, aluminum and other non-ferrous metals. It is equipped with a special high-speed steel blade and oiling device which feeds cutting oil to the blade. It leaves the cut perfectly smooth, thus eliminating additional finishing and polishing operations. Here is a powerful, accurate machine made available at a fraction of the prices customarily charged for machines of this type.

CUTS THESE MATERIALS—SOLID SECTIONS: Soft Brass up to 1¼" diameter; Half-Hard Brass, up to 1¼" diameter; Aluminum, up to 1½" diameter; Aluminum Extruded Sections, up to equivalent of 2 sq. in.; Copper, up to 1½" diameter, or equivalent of 2 sq. in.; Magnesium (Dow Metal), up to 1¼" diameter; Micarta and Similar Rods, up to 1½" diameter. TUBULAR SECTIONS: Soft Brass, Hard Brass, Aluminum, Copper, Dow Metal, Micarta and Similar Tubing, All up to 2" diameter.



The Delta Mfg. Co. also makes the complete line of Delta 14" and 17" single and multi-spindle drill presses—in use in many thousands of plants, large and small, all over the world.

DELTA
MILWAUKEE

Send for Special Cut-Off Machine Bulletin

giving full details and prices on this Delta Cut-Off Machine and accessories.

DELTA MFG. CO. (Industrial Division)
698 E. Vienna Ave., Milwaukee, Wis.

Please send me special bulletin on the new Delta Cut-Off Machine for non-ferrous metals. Also send latest Delta Catalog of Industrial Power Tools.

Name .....

Address .....

City ..... State .....

HELPING SOLVE INDUSTRY'S PRODUCTION PROBLEMS

The first practical equipment for accurately INSPECTING GEARS!

Quietness and accuracy in gears go hand in hand. "Illinois Tool" engineers were among the first to realize the need for equipment which would accurately inspect the three basic elements in gearing —involute profile, base pitch and helical lead. Inspection of all three basic elements was purposely not combined in a single instrument but designed in three separate machines to determine properly the accuracy of each individual element and avoid confusion.

Today you will find ILLINOIS Measuring Machines in the gear laboratories of most of the country's largest producers of gears. Some of the reasons for this widespread acceptance include:

1. Measurements are indisputably accurate, because gearing elements are checked against a "monument" of known accuracy.
2. Simplicity of design results in faster checking with fewer moves for the operator and less chance for error.
3. Rugged construction enables maintained high accuracy.

With the quickening of our industrial tempo so largely dependent on proper gearing, it will pay you to investigate the savings in inspection costs made possible by installing precision-built ILLINOIS Gear Measuring Machines in your laboratory.

Accurate gear checking introduced by "Illinois Tool" provided the necessary information for producing quiet, smooth-running gears!

ILLINOIS
GEAR MEASURING MACHINES
Involute Profile Measuring Machine
Base Pitch and Space Measuring Machine
Helical Lead Measuring Machine
Gear Charting Machine
Worm and Worm Gear Measuring Machine
Center Distance Measuring Machine
Hand Rolling Fixtures

ILLINOIS TOOL WORKS

MANUFACTURERS OF METAL CUTTING TOOLS AND SHAKEPROOF PRODUCTS

2501 N. KEELER AVENUE, CHICAGO, ILLINOIS • IN CANADA: CANADA ILLINOIS TOOLS, LTD., TORONTO, ONTARIO

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Gain Vital Minutes

with SEMS* Fastener Units!

Pre-assembled and delivered as a single unit!

Why waste time doing this?

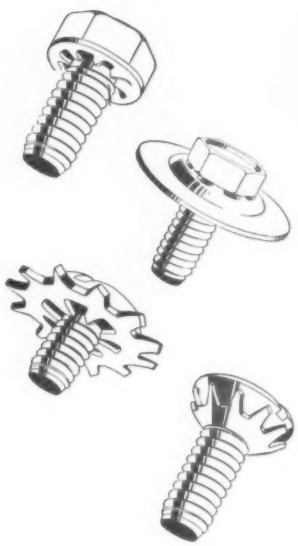
Perfect for fastening hard-to-reach parts!

Smoother production—no costly delays!

Today, when the call is for greater production efficiency, SEMS Fastener Units deserve immediate consideration. They not only save the assembly time formerly required in putting the lock washer on the screw, but they help smooth out production in so many other ways that their use is certain to show important time and money savings. Because the lock washer can't drop off, they handle easier, speed up driving, and help prevent "bottle-necks" on the assembly line. A test run of a few thousand will prove the advantages that SEMS Fastener Units offer. Try them in your product now!

*SEMS is the registered trade-mark of the Illinois Tool Works, manufacturers of Shakeproof Lock Washers. Only Shakeproof Lock Washers are used in the manufacture of SEMS Fastener Units.

AVAILABLE IN A WIDE VARIETY OF TYPES AND SIZES!



Write for FREE Sample Kit!

SHAKEPROOF LOCK WASHER CO.
Distributor of Shakeproof Products
Manufactured by ILLINOIS TOOL WORKS
2501 North Keeler Avenue, Chicago, Illinois
Plants at Chicago and Elgin, Illinois

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ALL SHAKEPROOF SCREW PRODUCTS AVAILABLE WITH PHILLIPS RECESSED HEADS!

"Fastening Headquarters"

SHAKEPROOF

SEMS Fastener Units . . . Lock Washers . . . Locking and Plain Terminals

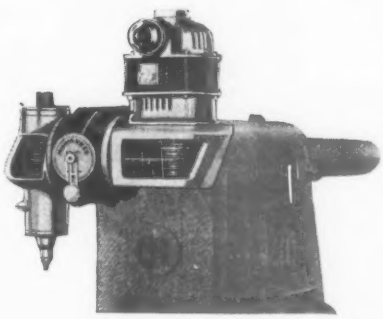
Thread-Cutting Screws . . . Locking Screws . . . Spring Washers . . . Special Stampings

THE HIGH SPEED MILWAUKEE MIDGETMILL GETS THE MOST FROM END MILLS AND MILLING MACHINES

Get the most from end mills and milling machines — get the correct high speeds that mean smooth, clean, accurate work and long tool life. Adaptable to any milling machine — completely universal — mills, drills and bores — fast, safe and easy to set up — a necessity for the proper use of end mills — innumerable applications to work on dies, fixtures, templates, etc.

KEARNEY & TRECKER CORP., *Milwaukee, Wis., U.S.A.*

The "THOU-METER"
— exclusive with the Milwaukee Midgetmill. Set cutting tools by direct reading—merely touch tool to work, set dial at zero, and mill, drill and bore until dial shows correct reading—in thousandths. No graduations—dials—stops—binding screws.

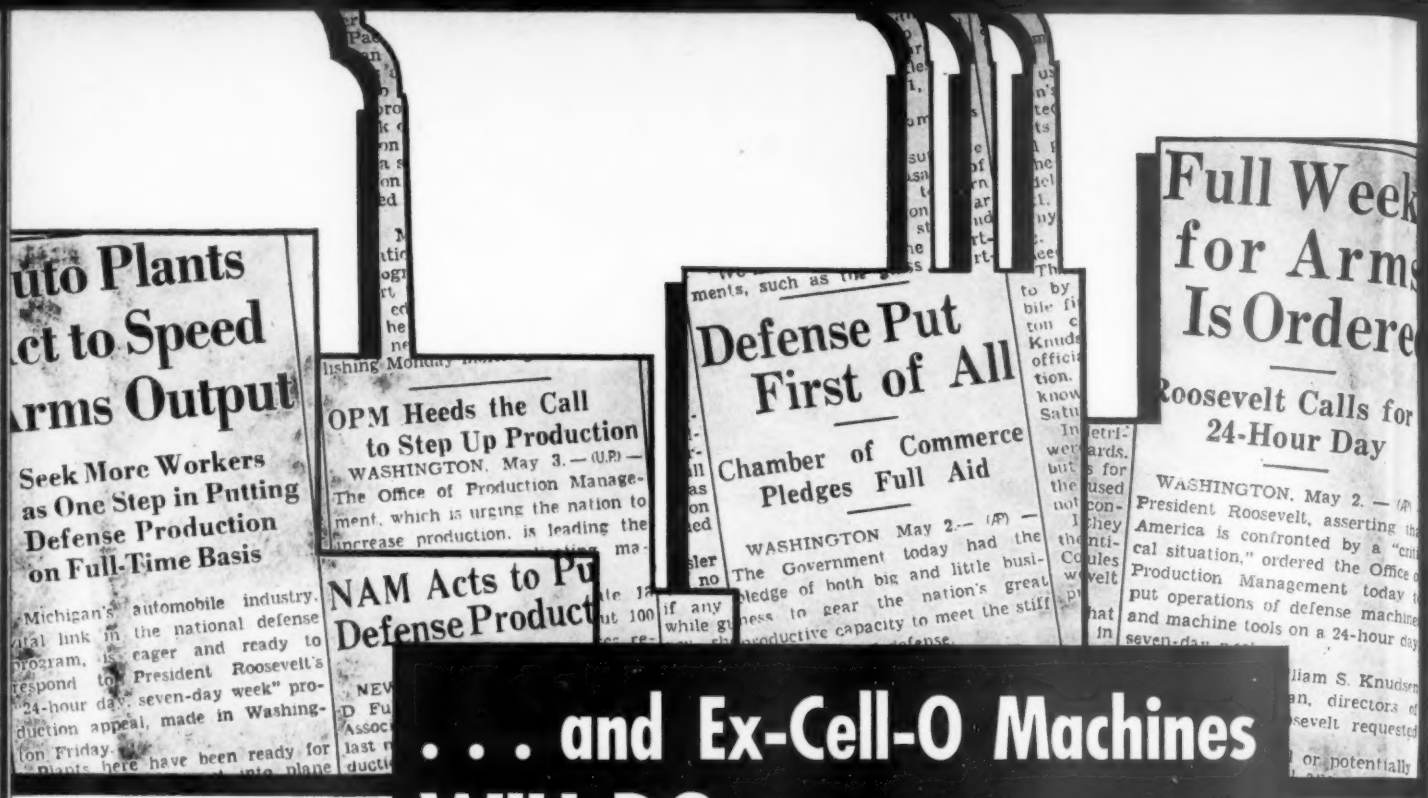


The MILWAUKEE SPEEDMILL
— for accurate end mill speeds up to 5300 rpm. Easy to operate, furnishes closer sizes and improved finishes —adaptable to all types of milling machines.

Write now for complete information on the MILWAUKEE MIDGETMILL and SPEEDMILL — built to the same quality standards as Milwaukee Milling Machines.

Products of

KEARNEY & TRECKER CORPORATION
MILWAUKEE MILLING MACHINES


uto Plants
ct to Speed
rms Output
Seek More Workers as One Step in Putting Defense Production on Full-Time Basis
Michigan's automobile industry, vital link in the national defense program, is eager and ready to respond to President Roosevelt's 24-hour day, seven-day week" production appeal, made in Washington Friday.
OPM Heeds the Call to Step Up Production
WASHINGTON, May 3.— (U.P.) — The Office of Production Management, which is urging the nation to increase production, is leading the
NAM Acts to Pu
Defense Product
Defense Put First of All
Chamber of Commerce Pledges Full Aid
WASHINGTON May 2.— (AP) — The Government today had the pledge of both big and little business to gear the nation's great productive capacity to meet the stiff
Full Week for Arms Is Ordere
Roosevelt Calls for 24-Hour Day
WASHINGTON, May 2. — (AP) President Roosevelt, asserting that America is confronted by a "critical situation," ordered the Office of Production Management today to put operations of defense machine and machine tools on a 24-hour day

. . . and Ex-Cell-O Machines WILL DO the Precision Work!

WITH their continuous operation the imperative demand of the day, the machine tools of the nation's industry must now really "take it." Day and night they must produce to the utmost—with unfailing accuracy. . . . Ex-Cell-O machines are built for just this kind of a job—for the most exacting type of precision work under high and steady production. Every Ex-Cell-O product—machines and tools for boring, turning, facing, for thread grinding, for lapping, for carbide tool grinding, for many other machining operations—represents the soundest engineering design, the most expert workmanship, the finest practical materials, a combination that has made the name Ex-Cell-O a familiar and outstanding one in every industry where accuracy and speed are essential in the production of metal parts. This is why manufacturers depending upon Ex-Cell-O machines in their plants under the nation's accelerated defense program are assured of maximum productivity.

EX-CELL-O CORPORATION • DETROIT, MICH.

XLO

Precision **THREAD GRINDING, BORING AND LAPPING MACHINES, TOOL GRINDERS, GRINDING SPINDLES, HYDRAULIC POWER UNITS, DIESEL INJECTOR PUMPS, BROACHES, CUTTING TOOLS, DRILL JIG BUSHINGS, ETC.**

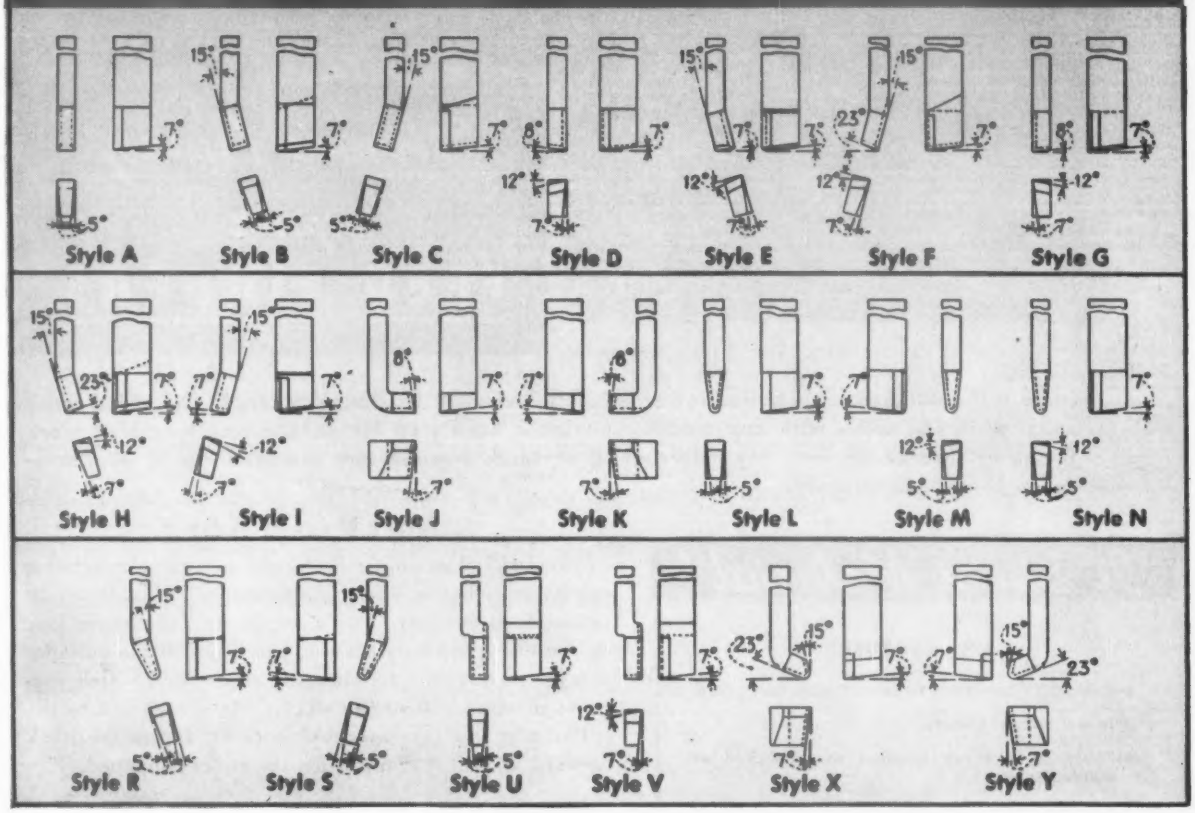
Immediate Deliveries . . . Lower Tool Costs

Use Haynes Stellite Standard Welded Tip Tools

YOU can take full advantage of the high production properties of Haynes Stellite cutting tools by using the many available styles and sizes of standard welded tip tools. These tools consist of a cutting tip of cast Haynes Stellite alloy welded to a tough steel shank. They can be used where solid bits are impracticable . . . and can perform any standard turning, facing or boring operation at low cost per piece machined . . . The sizes and styles shown in the table are carried in stock for immediate delivery. Others can be made to order to users' specifications.

Tool Sizes, inches	*Tool Styles*
½ x 1 x 7	ABCDEF
⅝ x 1 x 7	AD
⅝ x 1¼ x 8	ABCDEFGIKLMRSUVXY
¾ x 1½ x 9	ABCDEFGLMUV
⅞ x 1¾ x 9	A
1 x 1 x 7	ADGN
1 x 1¼ x 7	ABDGJKLMNRSXY
1 x 1½ x 10	ADUV
1 x 2 x 12	ADG
1¼ x 1¼ x 7	ADGJKLMNRSXY

STYLES OF HAYNES STELLITE STANDARD WELDED TIP TOOLS

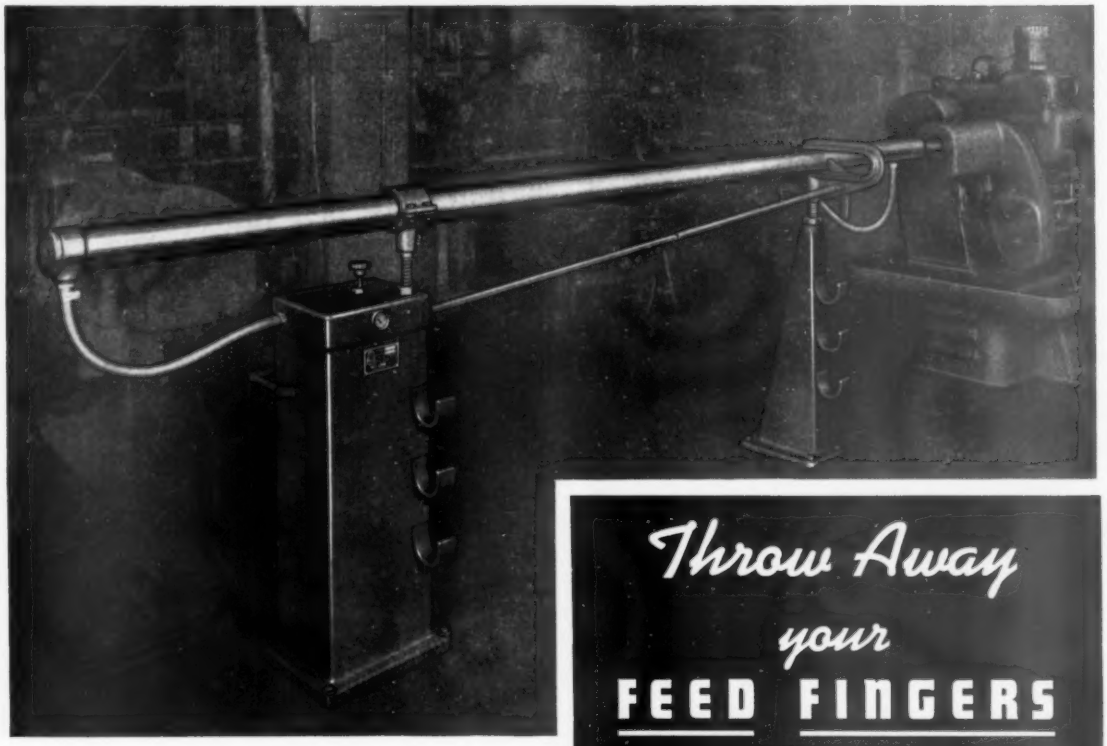


SOLID square and flat Haynes Stellite tool bits, and solid milling cutter blades are available for immediate delivery in a wide range of standard sizes. You can also obtain many special tools, such as brazed-in blade milling cutters, spot facers, and core drills; blades for boring and reaming; grooving, cutting-off, and forming tools. Complete information on request.

"Haynes Stellite" is a registered trade-mark of Haynes Stellite Company.

Announcing . . .

LIPE *Pneumatic* BAR FEED



Throw Away your FEED FINGERS

● It's a self-contained, automatic, power feeding device. ● It eliminates all old-style feed mechanisms. ● It will work with any machine having a fixed stop for determining length of work. ● It cannot scratch nor mar any material. ● It feeds rapidly any distance. ● It eliminates noise. ● It feeds accurately.

It Saves Material!

It Saves TIME

- **The entire bar is fed to the ultimate last piece.**
- **It will not feed short.**
- **There is no scrap because of scratched or marred work.**
- **Polished material of exact size may be used, thus saving a turning operation.**

• • •

- **Operation is instantaneous. Feeds the entire length of the bar.**
- **It is reloaded quickly.**
- **Requires no operator attention or energy.**

SIMPLE . . . SAFE

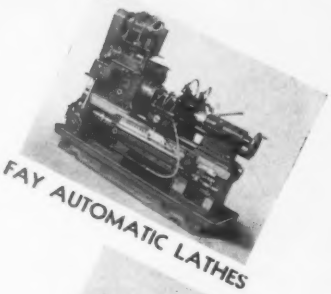
The LIPE Pneumatic Bar Feed is a simple, reliable mechanism that is safe and economical to operate. In principle it consists of an air-cylinder sufficiently long to contain a full-length stock bar. Within the cylinder is a piston having a ball-bearing cup center, which supports the free end of the stock. Air is supplied to the cylinder at low pressure, and instantly forces the stock forward against the stop when the collet is opened.

WRITE for full information on the application and operation of this newest contribution to greater turret lathe production. Easy to install. Quickly pays for itself. A nearby Lipe technical representative is available on request.

W. C. LIPE Inc., Syracuse, N. Y.

HEMISPHERE DEFENSE

begins here!



FAY AUTOMATIC LATHES

AUTOMATIC THREAD GRINDERS

OPTICAL COMPARATORS

AUTOMATIC OPENING DIE HEADS

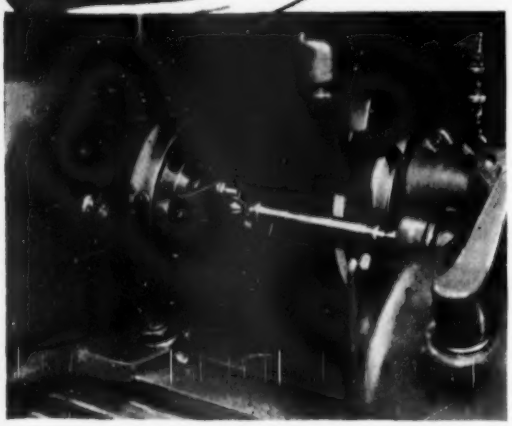
It begins at once with machines that must provide weapons for our armed defense. It can only continue in the future with machines that can manufacture products that command wide markets and permit Americans to continue earning adequate wages. Special machines built for defense work can only be junked, or written off, when the present emergency is over. Versatile, adaptable, standard Jones & Lamson equipment will meet many of your present requirements *to the utmost advantage* and still be available for retooling to earn welcome profits in the years to come. That's why it pays both ways to put your production problems up to Jones & Lamson engineers.

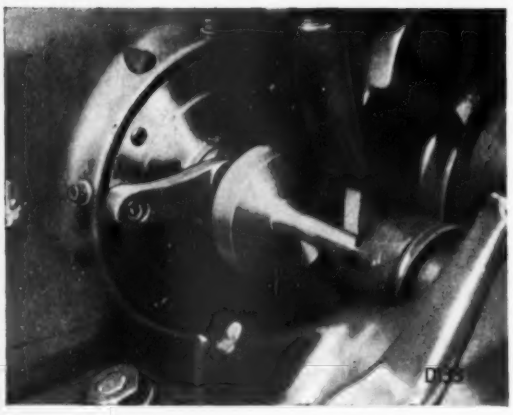
PROFIT PRODUCING J&L MACHINE TOOLS

JONES & LAMSON MACHINE CO.

SPRINGFIELD, VERMONT, U. S. A.

MANUFACTURERS OF SADDLE & RAM TYPE UNIVERSAL TURRET LATHES . . . FAY AUTOMATIC LATHES . . . AUTOMATIC DOUBLE-END MILLING & CENTERING MACHINES . . . AUTOMATIC THREAD GRINDING MACHINES . . . COMPARATORS . . . TANGENT AND RADIAL, STATIONARY AND REVOLVING DIES AND CHASERS





WHEN ONE MINUTE
Must Mean 60 Seconds

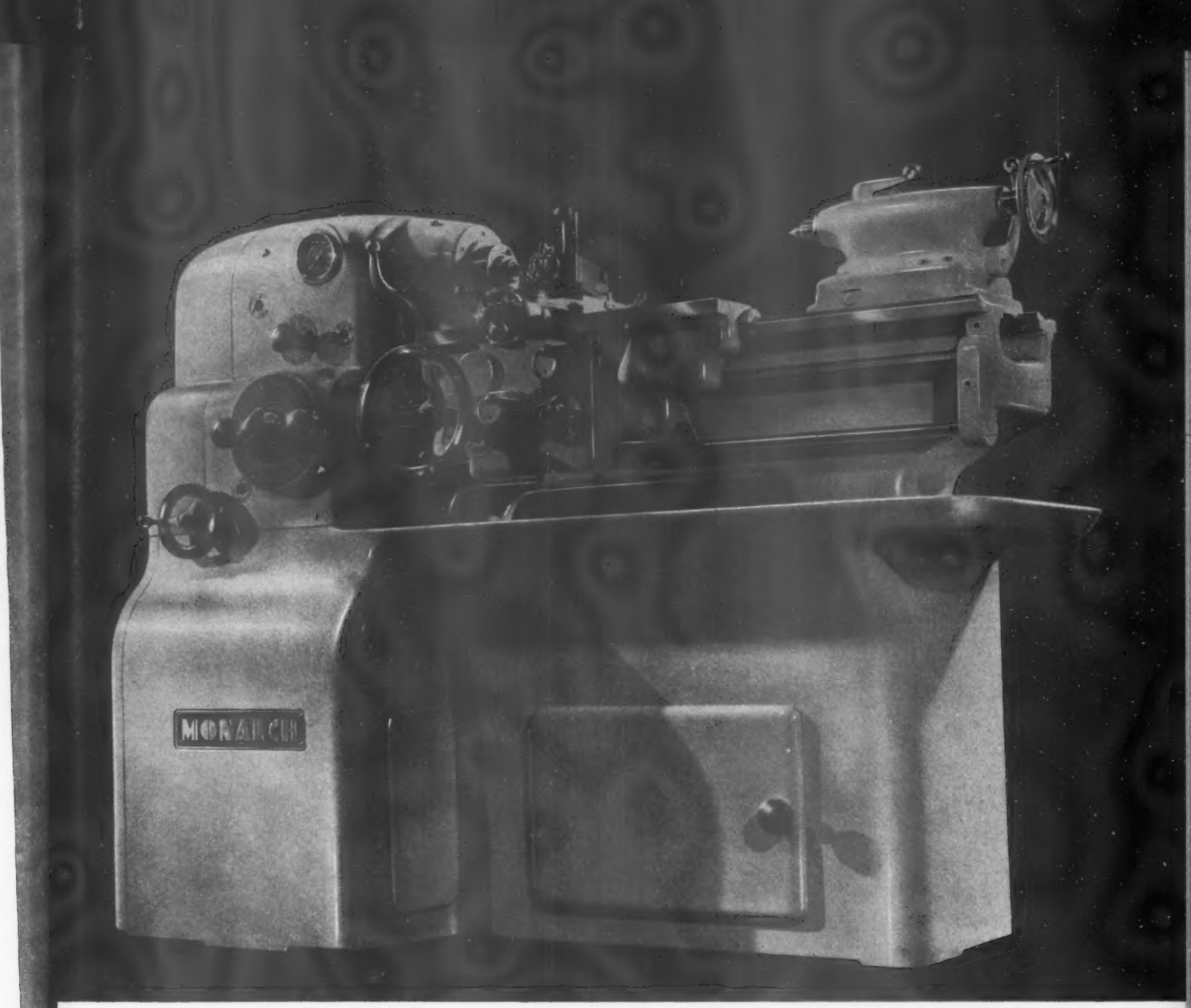
THERE are few organizations in which one minute is as important as at the Hamilton Watch Company of Lancaster, Penna.

To produce their widely known precision product requires the utmost precision in manufacture. Consequently their equipment is carefully chosen. It includes a Landis 10" x 24" Type C Hydraulic Universal Grinder, which is used for such tool room work as the lathe spindles and lathe step chuck illustrated. A limit of .0003" is generally maintained, although some work is held still closer.

You too can expect from Landis Grinders that split thousandths accuracy which assures split second performance.

360

LANDIS
WAYNESBORO *Tool Company* PENNSYLVANIA



The Monarch 10" x 20" Sensitive Precision Tool Maker's Lathe

TAKING its place in the front ranks of the National Defense drive, this Monarch Lathe is doing a magnificent job in the making of tools and gauges, vital to the success of America's Defense program.

Equipped with a 3 HP drive unit, the 10" x 20" Sensitive Precision Lathe provides, electrically, a stepless spindle speed range from 6 RPM to 2500 RPM. This range can be increased up to a maximum of 5000 RPM.

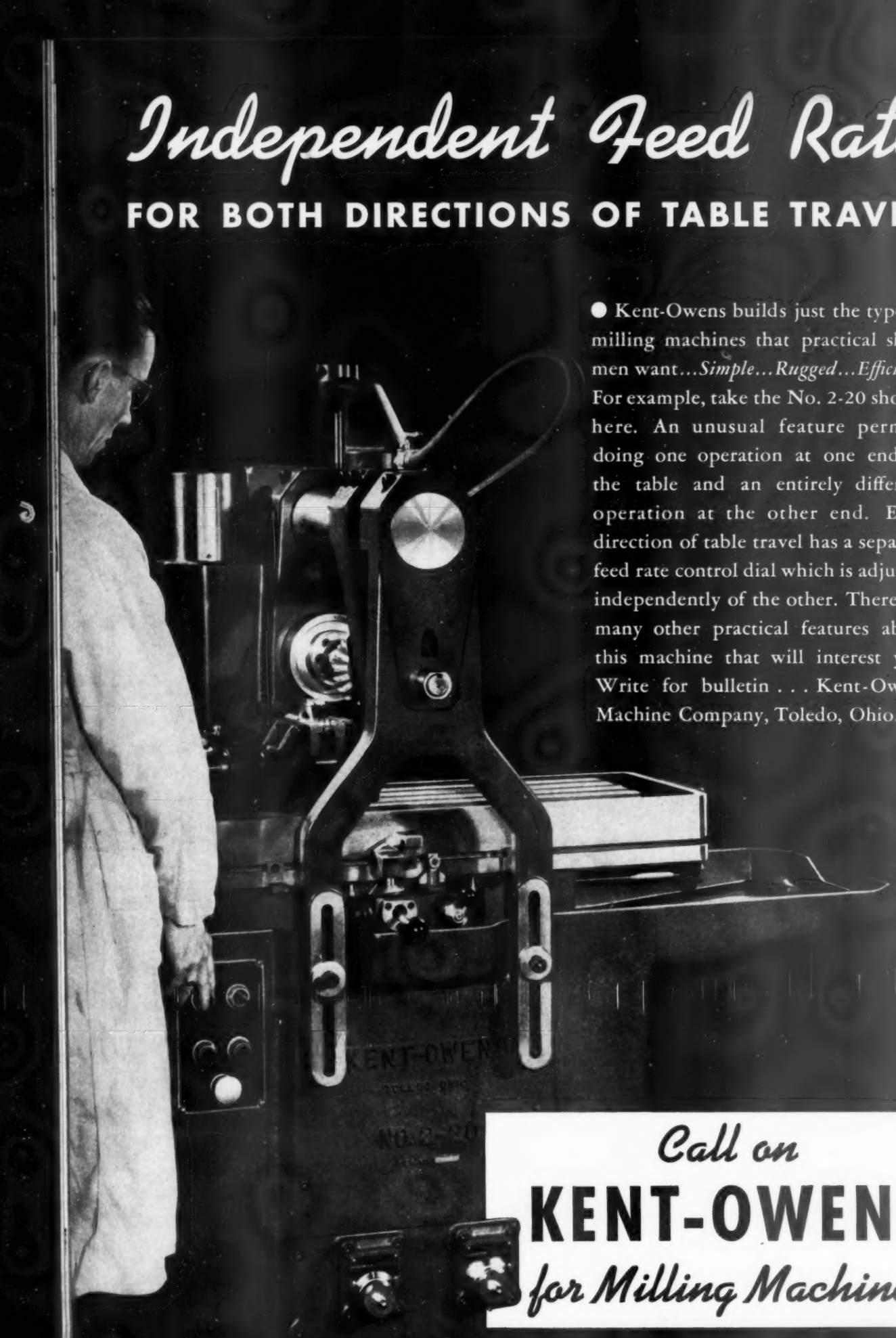
These lathes are now being delivered in large quantities to tool and gauge making plants as well as to tool rooms of most National Defense contractors, including the various government establishments. The Monarch Machine Tool Company, Sidney, Ohio.

MONARCH LATHES
COVER THE TURNING FIELD
SIDNEY... OHIO, U.S.A.

Chicago Sales Office: 622 West Washington Boulevard • Indianapolis Sales Office: 3910 E. 57th Street • Newark Sales Office: 1060 Broad Street • Pittsburgh Sales Office: 604 Chamber of Commerce Building. • *Agencies in principal industrial centers of this and foreign countries*

Independent Feed Rate

FOR BOTH DIRECTIONS OF TABLE TRAVEL



● Kent-Owens builds just the type of milling machines that practical shop men want...*Simple...Rugged...Efficient.* For example, take the No. 2-20 shown here. An unusual feature permits doing one operation at one end of the table and an entirely different operation at the other end. Each direction of table travel has a separate feed rate control dial which is adjusted independently of the other. There are many other practical features about this machine that will interest you. Write for bulletin . . . Kent-Owens Machine Company, Toledo, Ohio.

Call on

KENT-OWENS

for Milling Machines

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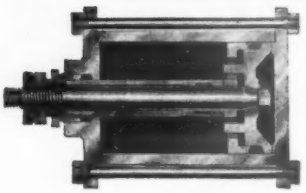
THESE CYLINDER FEATURES MEAN BETTER USE OF *Air Power*

16 in. x 7 ft. honed cylinder

Hannifin Pneumatic Cylinders combine two features that help you get the most out of air power—precision construction and simple outside adjustment for maintaining high efficiency piston seal. Hannifin Cylinders, including even the largest sizes, are bored and then honed. The cylinder interior is straight, round, perfectly smooth, allowing the superior piston fit that prevents leakage and reduces friction loss to the minimum.

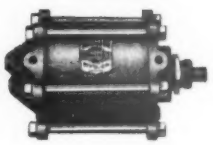
The Hannifin outside adjustment of the piston packing allows easy maintenance of the efficient piston seal. The soft, graphite-treated piston packing can be adjusted whenever necessary, from the outside of the cylinder, without disturbing any other parts. High efficiency seal can be maintained throughout the entire life of the packing, with important savings in air power, maintenance cost, and production time. The pistons can be repacked, in an emergency, with ordinary graphited packing—always available. No special parts are required.

Hannifin Pneumatic Cylinders are built in a full range of standard mounting types, sizes 1 to 16 in. bore, for any length stroke. Both single and double-acting types, with or without air cushion. Write for Bulletin 34 with complete specifications.



Sectional View

Model JR
double-acting cylinder



Model BR
double-acting cylinder

Model CR
double-acting cylinder

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HANNIFIN PNEUMATIC CYLINDERS

THE TOOL ENGINEER

TRADE MARK REGISTERED
IN U. S. PAT. OFF.

JUNE, 1941

Volume, X, No. 6

"You Can Defend America"

A thought-provoking booklet called "You Can Defend America" points out that once China built a wall, tells how her gatekeepers were bribed and how three times China found the enemy within her gates. The booklet then suggests that only yesterday France built a wall—the Maginot line—behind which she felt secure, yet France fell because there was a gap not only in the wall but in the spirit of the people.

"Does America have what China and France lacked?" asks this booklet, which stresses the importance of spiritual defenses. Does America, as she builds her wall of ships and planes and guns have the necessary morale? It is pointed out that we need three lines of Defense behind the wall: Sound Homes, Teamwork in Industry, A United Nation.

Family life once made America great but today home is more likely to be just a filling station in the daytime, and a parking place at night. Many of us would die for our family, but find it rather difficult to live with them. We need homes where there is laughter and love, where neighbors can find friendship and courage, where there is the will to defend America.

War in industry has cost Americans three million dollars a day, it can sabotage any rearmament program. The failure of France at the front was presaged by the failure of France in the factory. The defense of America demands that all of us rise above self-interest and together produce the materials and morale to make America strong.

America does not need to be divided and quarrelling at home just to prove she is a democracy. A crack football team isn't made up of quarterbacks—each depends on the others. With a united people we will have a spirit which no disaster will shake and no danger will weaken.

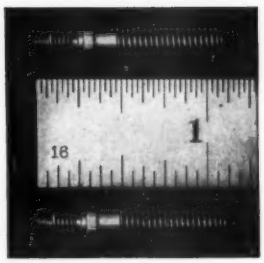
National character is the care of National Defense. We need something which can't be bought or appropriated—guts. Human nature is the bottleneck in the production of national morale. America needs a change of heart; we must live the American Way. Everybody is waiting for somebody else to begin. The secret of national unity is to have the guts to begin with yourself. If boss and worker put all their cards on the table, in a spirit of honest apology, would strikes and lockouts be necessary?

America has already been invaded by fear, hate, and greed. The battle line runs through every home, every office, every factory, every farm. Fight to make your home and community a pattern, to bring teamwork to industry, to unite the nation; then we will have Total Defense.

These thoughts, all taken from this booklet "You Can Defend America," are so worthy in our opinion as to fully warrant the prominence of our editorial page. Copies may be secured from Moral Re-Armament at Judd & Detweiler in Washington, D. C. or at the Fairmont Hotel in San Francisco. The cost is ten cents, less in larger quantities. More than two million copies have already been distributed.

HOW TO CUT FINE THREADS

LOOK at this brass stud—used for mounting instrument magnets. After being formed and the long end threaded on an automatic screw machine, the two threads on the short end are cut on a No. 1 W & S Turret Lathe—speed 1200 R.P.M. The larger thread is .112″-40, the smaller one only .057″-104.



The manufacturer, one of the largest concerns in the country, finds High Speed Steel "*Acorn*" Dies the best solution for this job.

"*Acorn*" Dies, because of their accuracy and their positive, finely controlled adjustment, are the ideal tools for cutting fine threads. Originally invented and manufactured by "G.T.D. Greenfield," they are typical of the contributions to modern manufacturing methods that have made "G.T.D. Greenfield" the country's leading and largest manufacturer of screw threading tools. Our complete catalog will be sent gladly on request.

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Recent Developments in

Direct Lift Aircraft

The future of private flying lies in the Helicopter with the present airplane being made into a sort of aerial freight train, according to Igor Sikorsky.

By IGOR I. SIKORSKY
Vought Sikorsky Aircraft Company
Stratford, Connecticut

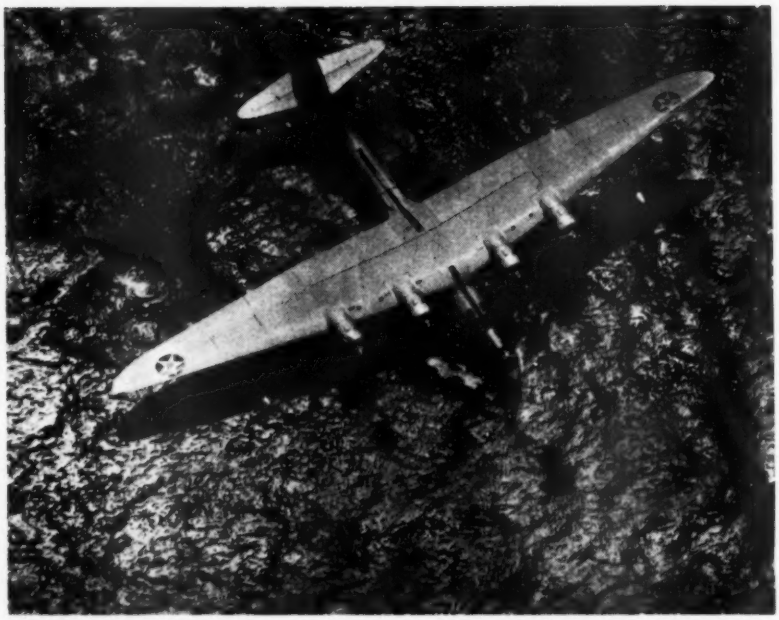
THE modern idea of air transportation is nearly always associated with the use of large fields for the departure and arrival of ships. As a general rule, an air traveler cannot start from his residence and reach his desired destination directly by airplane, as he usually can with an automobile. However, the dreams of the past and the positive predictions for the near future have foreseen a different type of aircraft that could be safely operated from very small spaces between buildings or trees, or from small platforms on tops of buildings. Such aircraft would open a vast new field of usefulness and could become a very valuable vehicle of transportation for the average individual, as well as serving a number of government uses.

If we will look in a very general way at the history of aeronautics, we can recognize certain broad phases in its advancement. The first phase, with lighter-than-air craft that began about 150 years ago, created considerable hopes of immediate success at that time, but never went beyond flying for sport, a certain amount of flying for scientific purposes and very limited amount of transport and military application.

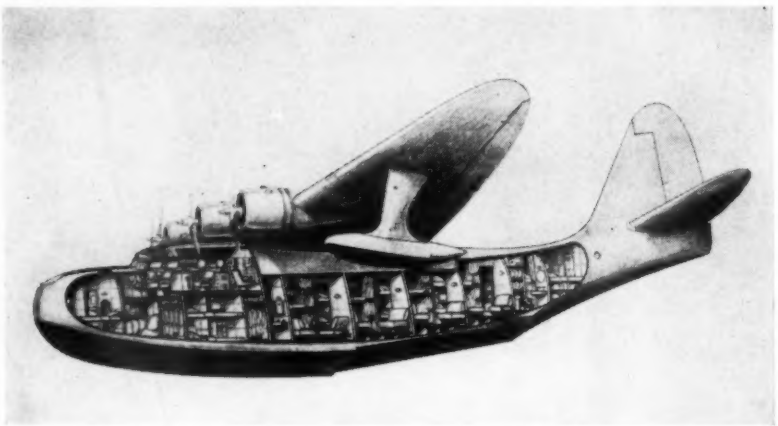
The second phase of the heavier-than air power flying started when the Wright Brothers achieved the immensely important results we all know. The military value of modern aviation needs no emphasis. We all know that no country can, at the present time, consider itself safe unless it has a powerful air service. This is really the front line and one of the most important branches of the national defense.

Now commercial transport aviation also has made substantial progress. Many of the things that were considered almost impossible only twenty years ago, have been realized. All oceans are now crossed with regular air lines, carrying mail and passengers and it is no longer an event to travel by air from any important place on this globe to any other big city situated on any of the continents, as well as on

The Sikorsky Helicopter
Vertical ascent possible when obstructions are present.



AMONG SIKORSKY'S achievements, other than the pioneering which he has done in the field of the helicopter, may be classed the patrol bomber (above) built for the U. S. Navy. This "Flying Dreadnought" is powered wtih four 1050 HP Wasp Engines. Illustrated below is a drawing of the new Sikorsky S-44A now being built for American Export Airlines.



most of the larger islands. All this success is well known to everyone.

But in one respect—private flying—progress did not go as far as had been expected by many of the early enthusiasts. Some fifteen or twenty years ago we often heard speculation about the privately-owned flying machine, or the private "Flivver", that could jump from place to place carrying people from their homes to their place of business, to their recreation spots, etc., as the automobile does. However, even now we have hardly one privately-owned airplane for every 2,500 automobiles in this country; and the rest of the world lags behind the United States in this respect.

It is very probable that the key to this vast field of private aviation is to be found in rotary wing aircraft, which means mainly helicopters as presently conceived. The development of this type of craft may really bring flying to the actual direct service of almost everybody. In order to prove this point, I will try to make a brief analysis of the characteristics of rotary wing aircraft compared to the conventional, fixed-wing airplane.

Place of Fixed-Wing Craft

As a point of departure, it should be made clear that a fixed-wing airplane requires a minimum of several hundred yards to take-off and land, and that this several hundred yards must extend in each of several directions in order to permit flying in all wind conditions. Rotary wing aircraft, however, reduce this requirement almost to the vanishing point. The helicopter, for instance, requires no ground run whatsoever since it takes off and lands in an absolutely vertical manner.

Frankly, I believe that when it comes to carrying heavy loads at considerable speeds for long distances, the fixed-wing airplane will remain the most efficient and successful type of aircraft. However, for certain kinds of service, convenience of operation may prove to be more important than load-carrying efficiency. If, for instance, we compare the automobile with the railroad, the number of ton-miles per pound of fuel in the railroad is much greater than in the automobile; yet the automobile's tremendous development is proof of the fact that it furnishes a service of its own which is so valuable that no railroad could replace it.

The main difference between the two is "personalized transportation". The railroad has to operate from terminal to terminal and the passenger has to provide himself with some means of transportation to reach this terminal and then for some other means of transportation from the station to wherever he wants to go. With the automobile, this is excluded. You take your car at your own front door and you usually can go within a few feet of your destination. I believe that in aviation the same direct analogy may be drawn. The fixed wing airplane, like the railroad train, would have to be operated only between terminals; while rotary wing aircraft, when properly developed, would permit operation to and from small spaces in the backyard, or indeed any tiny clearing, and eventually even from platforms on tops of buildings.

I believe it would not be an exaggeration to say that a well-developed rotary wing flying machine would take less than one one-hundredth part of the landing area that would be necessary under identical conditions for the average fixed-wing airplane.

The ability of rotary-wing aircraft to rise and descend with no forward speed permits transforming this type of craft into an ideal amphibion for use on either land or water by mounting it on flexible air bags, which can easily be designed to furnish both flotation on water and shock-absorption on land.

Now we will consider what can be the operating characteristics of such an amphibion aircraft. Obviously, it would be more universal than any other method of transportation. It would share with all aircraft complete release from predetermined, earth-bound highways. But in the matter of landing places, it would be infinitely more flexible than its fixed-wing sisters. Practically any place where there is room to swing the rotor blades is a suitable "airport". Even landing in deep snow, mud or swamp would not create a hazard. If it lands on very thin ice, on which it would be dangerous even for a pedestrian to go, such a machine would perhaps be the only thing that could land on it safely, because if it breaks the ice, it still will remain afloat.

Uses of Helicopter

Having outlined briefly these general ideas, I would take the liberty now of going over some specific uses which we can expect from an aircraft of this type. Let us first glance over what can be the military use of rotary wing aircraft. To my mind it would not compete with any of the existing types of aircraft used for military service. In other words, it would not replace any of them. They all would have to remain, each one at its particular job. But the rotary wing aircraft would open a considerable new field of usefulness for military purposes. One of the most important would be for communication between the various units of an army. In this respect, this aircraft would replace, in many cases, the automobile, the horse, even the pedestrian, and in fact any other means of transportation.

Such work as observation and fire control, particularly at short distances (the work that was done in the last War by captive balloons), is obviously the type of service for the rotating wing aircraft.

The direct lift aircraft (by which I refer to the helicopter) would also be of great value for convoying motorized units or any detachments moving over the roads and for short range attacks with bombs or other weapons. Operation in the rear of the lines could be excellently performed by a helicopter, including such vital services as transportation, particularly during the night, of men and materials. This latter operation could be successfully performed under conditions of terrain where literally no other vehicle could be used. The helicopter could take on and deliver men or goods by raising or lowering them in a basket suspended on a rope. This would permit transporting material to and from completely inaccessible places in the midst of even woods or rocks or mountains.

Very valuable services could be expected from a direct lift aircraft in connection with naval warfare. It would be perhaps the most suitable means of coastal patrol, of patrolling the sea for submarines, as well as attacking them with depth charges, of communication from ship to ship and from ship to shore, and of short range observation with a helicopter operated from the deck of the surface vessel or from a small raised platform.

The helicopter will be unequalled and unsurpassed for saving lives under a great variety of conditions in time of peace, as well as war.

So far, I have discussed what the direct lift aircraft will do. Let us now consider what this newly developed type of aircraft is.

A helicopter is a flying machine that is lifted and supported in the air by the action of one or more large overhead lifting screws that are driven directly by an engine and that support the whole weight of the machine. The idea of it has been known for centuries, but great difficulties were connected with the control and stability of such aircraft. It was not until recently that these difficulties were overcome and it became possible to construct a successful and practical helicopter.

Successful Tests

During the past two years, successful work has been carried on by the Vought-Sikorsky Divison of United Aircraft Corporation which took the initiative and leadership in this important new line of aviation. This helicopter which was designed and built has made a large number of successful flights that thoroughly demonstrated the practicability of such aircraft. The ship recently established for the first time a national endurance record by remaining in the air near our plant at Stratford, Conn., for a period of 1 hour 5 minutes. The rubber floats, to which I referred earlier in my talk, have also been installed, and the ship made a number of highly successful flights from both land and water. It is capable of rising straight up, hovering over one spot, flying forward, backward or sideways. The control is so satisfactory that the aircraft in flight has repeatedly approached a man standing on the ground or on a pile of rocks, while the helicopter hovered in the air close enough to permit loading or unloading a package on board the machine. In other cases, a rope has been dropped from the machine, and while the aircraft hovered over one spot, a man fixed a load to the rope which was then carried off by the helicopter. The ship has actually been operated time and time again from small spaces, between trees and building. It has taken off with a huge tree only about 10 feet in front of the machine. The helicopter would rise vertically in this case, would then turn and start moving in the desired direction.

In conclusion, I would state that the work that has been done and the results already achieved leave no doubts that in the helicopter we may see a new and most important type of aircraft that will permit a vast expansion of the use of air transportation far beyond what is being done at the present time.

Wurra! Wurra!

The center runs out a foot and a half,
The belt is so frayed it would make you laugh.
The chuck is buried under the bench,
And, the devil himself couldn't find the wrench.
You're set to cut a ten-pitch thread
But you find your cutting an eight instead.
And you realize that your pals so true
Have shifted the lever a notch or two.
The boss comes in ere you're well begun,
And asks where you're piling the ones you've done.
So you start to rush and quick as a wink
You put a couple of jobs on the blink.
And when he gives you the fishy eye,
It's hard to remember your alibi.
Oh, the drills cut big and the reamers small,
And the tool bits won't stand up at all.
And so it goes from eight to five,
In this modern struggle to keep alive.
But although this business is full of grief,
I'd rather be here than on relief. —*Ken Lane*

By complete cooperation of four companies the production of high speed reconnaissance cars for the Army has reached a rate of fifty per day. An example of our Defense efforts.

Fifty "Blitz Buggies" A Day

UNUSUAL, in these troublous times, is the news that a defense project is running smoothly. Even more rare is news that a defense project is finished; but such is the status of one through which the Ford Motor Company has just delivered 1500 scout cars to the U. S. Government at a cost of $1,387,500.

The "blitz buggies," as they are called, were produced at a rate of around 50 per day once tooling for production was completed. It is expected that other orders will follow the initial one since tests have indicated that the car is well suited to modern tactics of warfare.

Production of the blitz buggy is largely the responsibility of four companies. Its speedy completion is the result of complete cooperation—even to the loan of needed machinery—between these concerns.

The gears and axles are being built by the Spicer Manufacturing Company of Toledo. The transmission permits six speeds forward and two in reverse. The car may be driven by either front or rear axles or both.

The frame was specially designed to withstand severe shock and is the work of the Midland Steel Products Company of Detroit. The frame is attached to the axles by four leaf-springs

Road Test
Axles are unusually tough.

placed longitudinally rather than by the use of two transverse leaf-springs as is customary when this type of suspension is used in automobiles. Brakes are four-wheel hydraulic with drums 9 inches in diameter.

The motor is a four cylinder Ford tractor engine stepped up to produce 42 H.P. and to attain a top operating speed of 57 mph. A great deal of time and expense in the production of the cars was saved by adapting this standard engine to meet the needs of the blitz buggy.

The body is being built by the Edward G. Budd Manufacturing Company. Of severe construction—even for the army—the body makes no attempt to provide comfort, but includes safety belts and railings to keep passengers from being thrown out in cross country driving.

The entire design is intended to keep size and weight down. As a result the car weighs only 2100 pounds, despite its rigid construction, and stands only 38 inches high at the cowl.

The ignition system is compactly placed close under the cowl covering and is so protected that it remains dry even when the car is splashing through water above the axles.

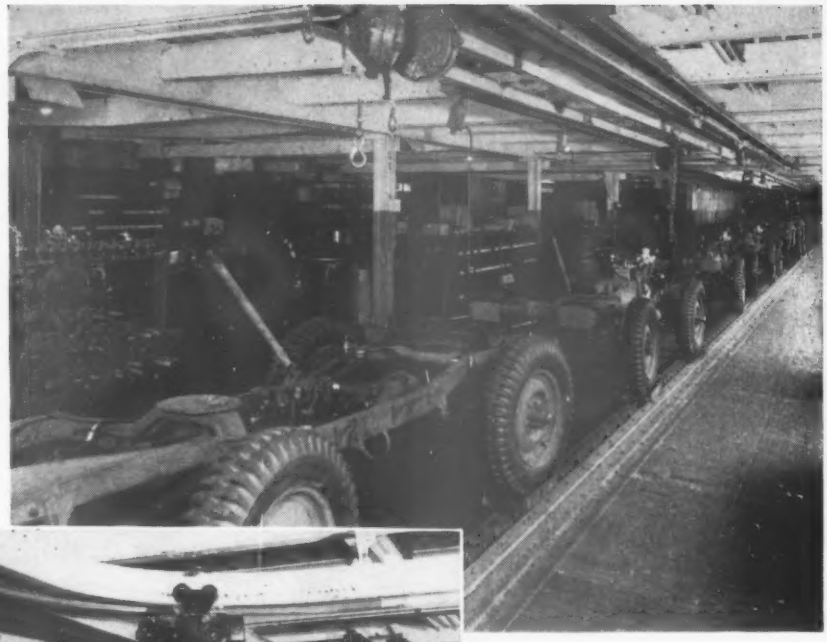
Blackout lamps both in front and rear augment regular head and tail lamps. Headlights, concealed from above by cowl covering, can be swung around to throw light on the engine in the event repairs in the field are necessary.

The blitz buggies are assembled on a line in the Rouge Plant of the Ford Motor Company. Progress of the cars down the line may be clearly seen by a study of the illustrations. The compact design of the cars makes for exceptionally close working quarters in much of the work.

Frames, axles, and transmission are assembled to form the beginning of the line. Motor is lifted into place by a hand operated chain hoist. Body is swung in from the side on overhead rail with electric lift. Most of the assembly is done with bolts.

Completed blitz buggies are given a rough field test and then returned to the plant for a detailed inspection by the Government. Cars move down an "inspection line" where the government men use the assembly line method of inspection with each inspector checking only certain specialized items.

In use the blitz buggy demonstrates its ability to handle grades up to 80% with driver and 68% when fully loaded, to plough through mud and water, to speed over rough terrain; in short to meet the requirements for a scout or reconnaissance car in active service with a mobile army.



ASSEMBLY OF THE "Blitz Buggies" is shown in these pictures. The line starts (above) with assembly of frames, axles, and transmission. As cars move slowly down the line assembly is continued with motor hoisted into place. Bodies are swung in from the side (left) on an overhead rail, and bolted to the frame (below) as electrical connections are made and cars are completed ready for testing.

Army Trucks Pose Special Problems

The backbone of the modern mobile army is the sturdy unspectacular truck. To meet the needs of our Defense Program trucks of unusual sturdiness are being designed, and the problems of their mass production are being met and solved.

TYPICAL of the type of work being done in the mass production of Army trucks by several truck manufacturers is the program of the Chevrolet Division of General Motors. Recent design changes have made many basic changes in the production of the one and a half ton four wheel drive trucks illustrated on these pages. The 4 x 4's as they are called, are now in full scale production in plants spotted throughout the country.

The engine is equipped with a special deep oil pan, to permit negotiation of grades up to 65 per cent with full retention of oil at both the front and rear bearing, and maintain oil level without undue raising, thereby preventing excessive oiling of the cylinder bores during heavy grade operations.

Of unusual interest are the operations at the Gear and Axle Plant in Detroit. Both front and rear axles are hypoid-geared, as contrasted to the more conventional bevel gearing. Extra gearing in the transfer case permits the driving load to be taken on the forward side of the teeth in the front axle instead of on the reverse side, as has been customary. This is said to increase both the efficiency and durability of the front axle substantially. The axle housing is of a one-piece, heat-treated, banjo type with inspection plate, thereby making the third member assembly removable for servicing without removing the axle from the vehicle.

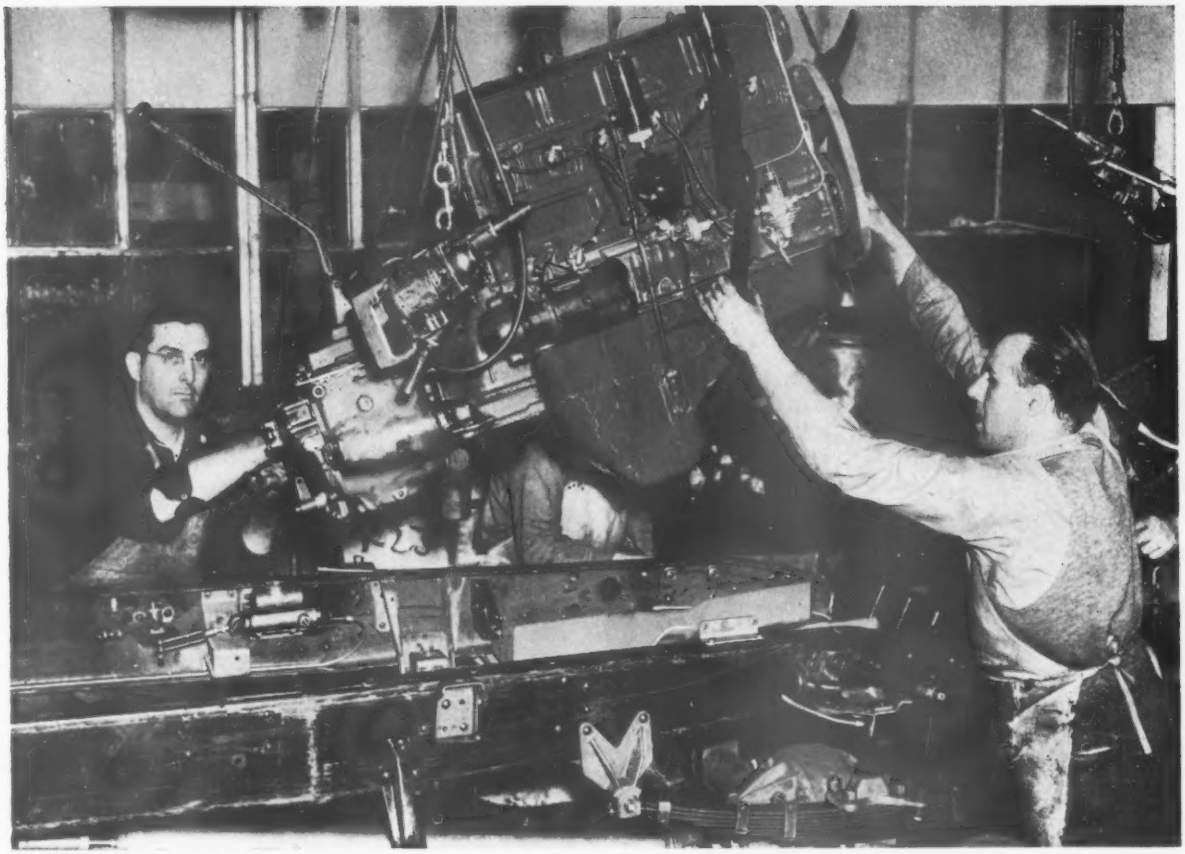
Centering of the universal joints of the constant velocity type in the front axle, used to drive the front wheels, is accomplished by locating flanges on the joint yokes themselves, rather than depending upon shims and adjustments at the axle shaft ends.

Steering gear on the new Army trucks is of the ball recirculating type. This is said to insure comparatively easy handling, in spite of the fact that driving loads are taken through the front wheels in addition to the usual load imposed on rounding corners.

Sub-assemblies are produced at a number of plants, motors are produced in the Flint plant, and final assemblies are made at Flint, Michigan; St. Louis, Missouri; Tarrytown, New York; Kansas City, Missouri; Baltimore, Maryland; Atlanta, Georgia; and Oakland, California. On these pages are illustrated a few of the operations taking place in these various plants, as well as some showing the important place which the completed trucks take in our National Defense.

CARBURETORS for U. S. Army trucks are manufactured at the Carburetor Hardened and Ground Parts plant, Bay City, Mich. Assembler draws parts from conveniently placed bins and operates electric screw driver on assembly line.

MOTORS are placed on test blocks at the Chevrolet plant in Flint, Michigan. After testing at this plant, motors are shipped to assembly plants scattered throughout the country. These engines are accepted only after rigorous testing.



ASSEMBLY at Oakland, California is underway as this engine, built at Flint, is lowered into position on the chassis. The engine has a displacement of 235 cubic inches and develops 93 horsepower and 192 foot pounds of torque at a speed of from 1,000 to 1,900 revolutions per minute. Note the longitudinal type of leaf springing which is used for attaching the frame to the axles. A special transfer case design permits greater ground clearance with a chassis 3 inches lower.

TRANSFER CASE GEARS are produced in the Motor Division Plant, Toledo, Ohio. An inspector in the gear cutting department is shown checking them. The transfer case has a compactly designed one-piece instead of two-piece case.

VALVE ADJUSTMENT is made as an engine intended for one of the Chevrolet Army Trucks is prepared for shipment from the Flint plant to one of the assembly plants spotted throughout the country. This engine has met with rigid tests first.

CAB ASSEMBLY LINE in the Chevrolet assembly plant at Atlanta. The cab is mounted on a sub-frame which is floated on springs and rubber. Under the conditions of extremely rough terrain operation such as these units encounter, this construction is said to limit to a high degree road shocks reaching the cab and driver. The entire front end assembly is also carried independently of the frame side rails, to keep road shocks from reaching the sheet metal and radiator.

FIRST SPEED COUNTER GEARS are checked on a gage by an inspector at the Chevrolet Transmission plant in Muncie, Indiana. After checking and sub-assembly in this plant the parts are shipped to one of the final assembly plants.

ASSEMBLY of completed trucks at the Motor Division plant in Oakland, California is here in progress. A power driven wrench, supported by an overhead weight-balanced cable is used to place lugs on the heavy wheels used on Army trucks.

COMPLETED TRUCKS are, many of them, used in the Army's first completely motorized division, which is stationed at Fort Benning, Ga. Commander of the division is Major-General Lloyd R. Fredendall (above). The division had its first real test of what it might meet in action when it made a march to Panama City, Fla., a distance of over 200 miles. The history-making march was completed in ten hours. The personnel and equipment of the division moved in three great columns each averaging 45 miles in length. General Fredendall observed the march, which involved ten thousand men and a thousand trucks, from a plane of the 92nd Observation Squadron. He issued orders to the division by radio. Arriving at the destination a switchboard truck (above right) parked by the post command and within a few minutes wire-laying trucks connected the General by telephone with all parts of the encampment. A complete field kitchen capable of supplying the force of ten thousand men with food was also carried on trucks, one of which is illustrated (right). In the dramatic photograph below a group of Chevrolet 4 x 4's forming part of one of the columns is silhouetted against the Georgia dawn.

★ ★ ★ ★ ★

Coil Springs for Special Machines

A time saving method for selecting coil springs that will be welcomed by everyone who ever has to specify springs. With the aid of these special charts and standard formulae the process is comparatively easy.

By CLIFFORD E. IVES

Ives Engineering Laboratories
Chicago

IN the design of special machines, jigs and fixtures as well as products, the designer is often called upon to select a spring. Die set manufacturers list standard springs for use in stamping dies, but these springs are not often acceptable to the general application of springs in special machines.

Liberal use of springs is made in nearly all special machines, and the designer must be familiar with the formulas and should have had some practical experience before attempting to apply springs to his job.

The usual formulas give the deflection per coil under any given load, but the factor which is of first interest to the designer is the scale of the spring in pounds per inch, or how far the spring will deflect under any given load. He also questions whether the spring will safely carry the load under repeated stresses.

In the process of laying out a machine, the designer may require several hours by a "cut and try" method to design one spring for one application but he forgets the formula between jobs and has to do the same thing over again on the next spring job and possibly several times on the same job. In the course of the design of the spring his mind is distracted from the functions of the machine itself.

After a designer has gone over this process repeatedly he realizes the necessity of a quick solution of these problems for all time by developing a chart.

Figure (1) is a chart by means of which the designer may determine any one unknown factor when the other three are known for instance, if the wire size, the outside diameter of the spring, and number of coils are known, he may determine the scale of the spring in pounds per inch.

Figure (2) is a chart which gives him the safe load of the spring in pounds.

The designer first uses Figure (1) to determine the scale of the spring and then uses Figure (2) to determine the safe load.

The following discussion will make clear to the reader how the accompanying charts were developed. The regular Coil Spring formula was simplified by the following process so that it could be plotted mathematically.

Let:—

- f = Total deflection of the spring in inches
- S = Scale of the spring in pounds per inch of deflection
- P = Total load in pounds
- D = Outside diameter of the spring in inches
- d = Diameter of wire in inches
- $r = \frac{(D-d)}{2}$ = mean radius of the spring in inches
- n = The number of coils in the springs
- G = Shearing modulus of elasticity (11,500,000 to 15,000,000)

Then Let f = 1″ so that:—

- P = S, the load required to deflect the spring one inch, and
- G = 11,500,000

Then the Coil Spring formula:—

$$f = \frac{64r^3nP}{Gd^4} \text{ becomes}$$

$$S = \frac{Gd^4}{64\ (D-d)^3n} = \frac{1{,}440{,}000d^4}{(D-d)^3n}$$

$$\frac{}{2}$$

From the above formula Figure (1) was plotted.

The safe load formula was simplified as follows:

Let:—

- L = Safe load in pounds
- Sv = Safe shearing stress in pound per square inch = 60,000
- D, d, and r the same as above

Then the safe load formula:—

$$L = \frac{Sv\pi d^3}{16r} \text{ becomes}$$

$$\frac{60{,}000\pi d^3}{16\ (D-d)} = \frac{23562d^3}{(D-d)}$$

$$\frac{}{2}$$

From which Figure (2) was plotted.

The most satisfactory spring is one which has the greatest volume of wire for its load and space requirements because it requires the least change in pressure within its range of deflection.

By means of these charts the best and safest spring may be arrived at quickly by a rapid trial method. Its free length, compressed length, compressed load, and any intermediate length and load may be rapidly determined because the scale of the entire spring is given in *pounds per inch* of deflection.

Chart 1

For determining spring scale when wire size, outside diameter, and number of coils are known.

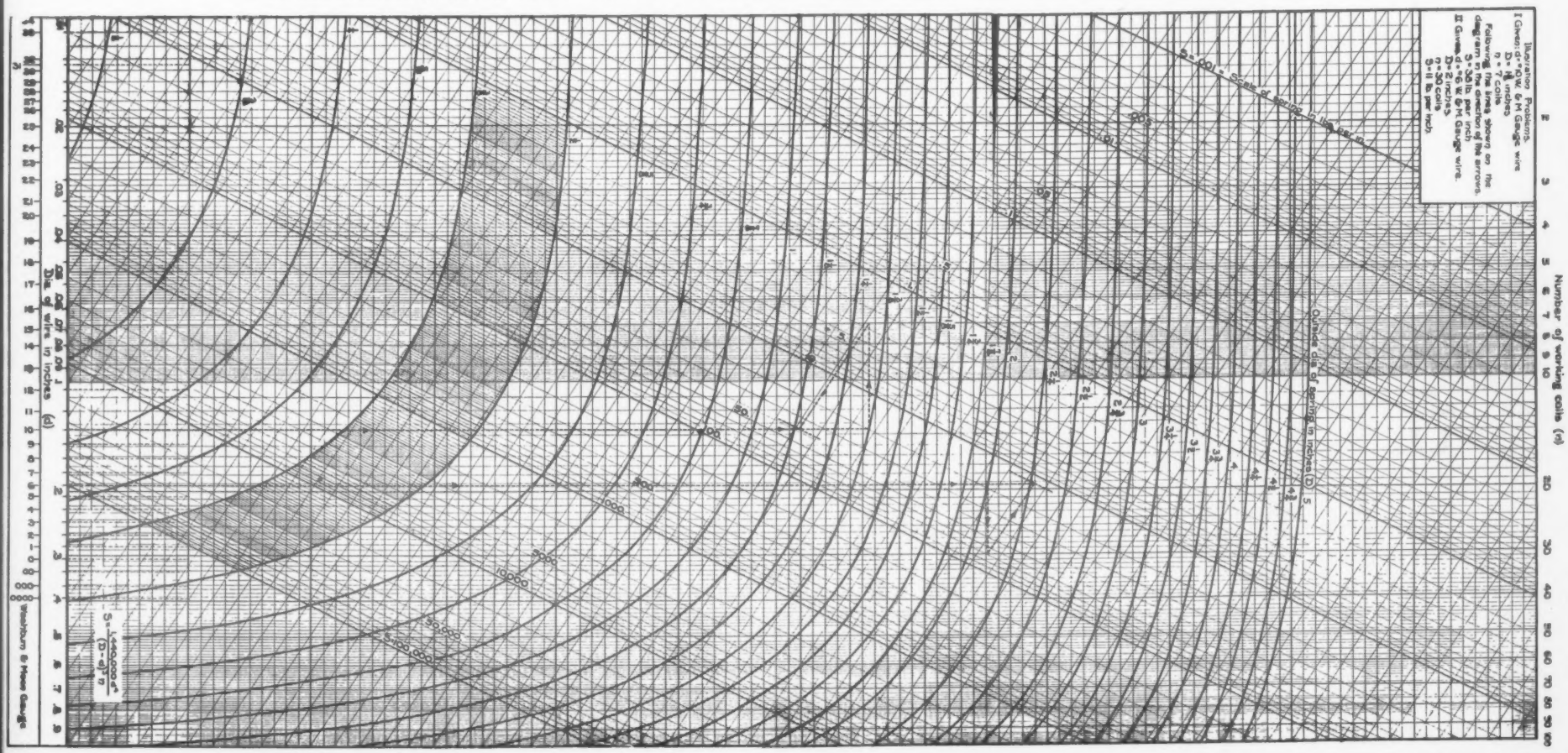


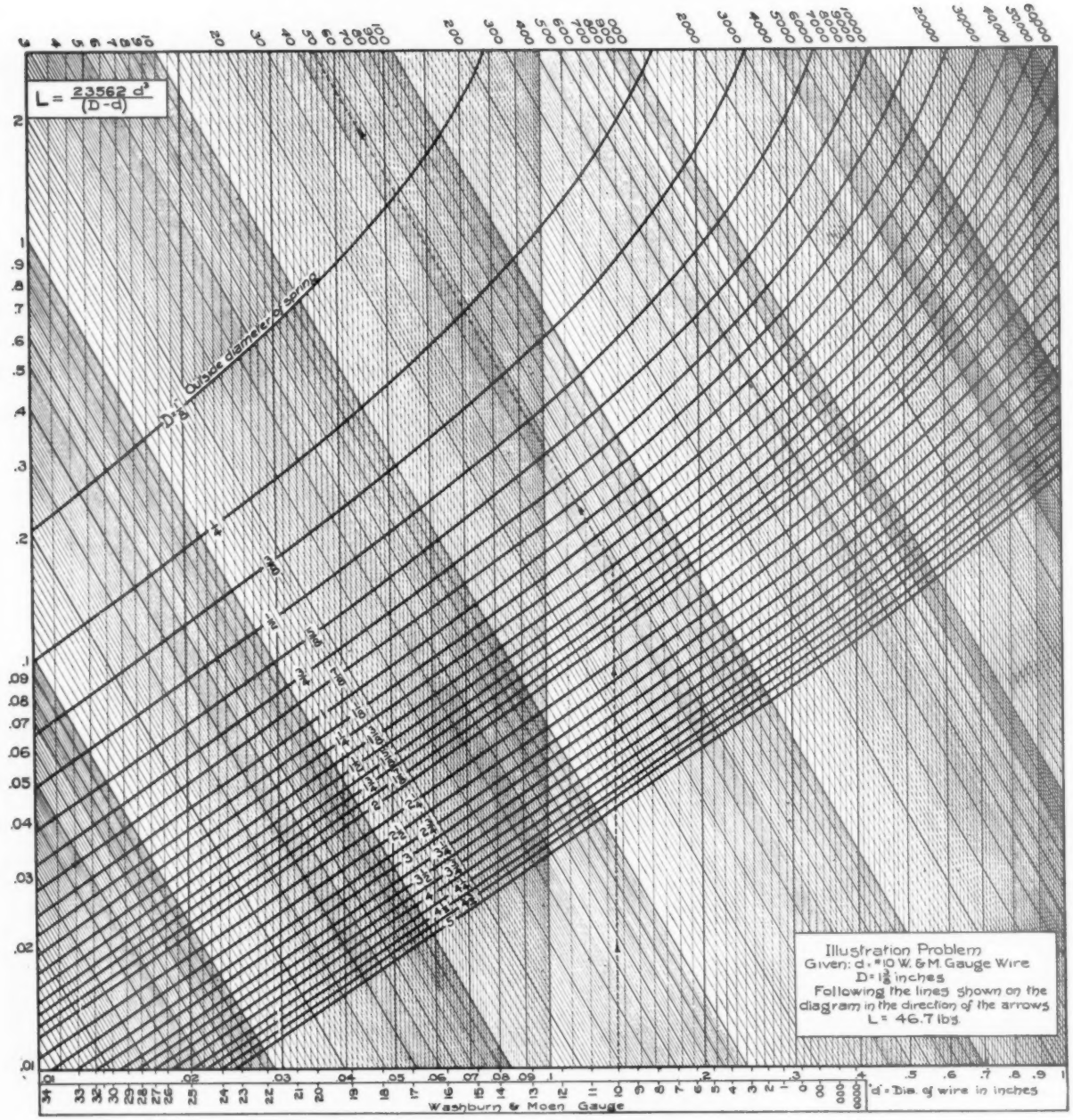
Illustration Problems
I Given: d = .104 in. B. & S. Gauge wire
D = .8 inches
n = 7 coils
Following the sighting shown on the diagram, the reading shown on the arrows
S = 36 lb. per inch
II Given: d = .16 W. & M. Gauge wire.
D = 2 inches
n = 30 coils
S = 11 lb. per inch
Scale of spring in lbs. per inch (S)
Outside dia. of spring in inches (D)
Number of working coils (n)
Dia. of wire in inches (d)
Washburn & Moen Gauge
$S = \frac{1440000\,d^4}{(D-d)^2 n}$

FROM THE TOOL ENGINEER FOR JUNE, 1941

CHART BY IVES AND STERN

Chart 2

For determining safe load of a spring.


L = 23562 d⁴ / (D - d)
D = Outside diameter of spring
Illustration Problem
Given: d = #10 W. & M. Gauge Wire
D = 1⅜ inches
Following the lines shown on the diagram in the direction of the arrows
L = 46.7 lbs.
d = Dia. of wire in inches
Washburn & Moen Gauge

FROM THE TOOL ENGINEER FOR JUNE, 1941

CHART BY IVES AND STERN

Jigs and Fixtures for

Railroad Shops

How properly designed jigs and fixtures save time in a railroad shop; examples that may be used in many other types of work.

By H. W. STOWELL
Albuquerque, New Mexico

AS an example of what may be done with proper attachments in the railroad shop, the fixtures used in connection with the draw-cut shaper for doing shoe-and-wedge work, and box work, may be cited. There is certainly no comparison between these functionally-designed gadgets and the older shoe-and-wedge chucks and various holding fixtures used to secure crown brasses in the lathe and on the boring mill table. Probably the time required for machining these parts has been reduced two-thirds by modern machine tools with proper attachments.

Below are illustrated a number of inventions that originated at the Albuquerque, New Mexico shops of the Santa Fe. Most of these are in daily use, and by some of these tools, work is done that would be almost impossible any other way.

Figure 1 shows a planer undercutting tool covered by a patent that will expire in a few years. It is designed to give clearance to the tool on the back stroke of a planer or shaper when planing under ledges. Undercutting is necessary to planing such parts as furnace bearers, deck castings, extended back valve heads, etc. In ordinary work clearance for the tool on the back stroke is provided by the clapper block of the machine that is pivoted and allows the tool to raise and clear the work when dragging backwards over the surface being planed. In undercutting, this movement is in the wrong direction for clearance and some special provision must be made. It is possible to lock the clapper of the machine so the tool will not raise but the tool will drag and soon become dull. The special tool holder illustrated, overcomes the difficulty of undercutting by a swivel block that swings about a quarter of an inch radially about a backwardly inclined spindle. This radial movement about the spindle takes place on the back stroke and allows the tool to clear. For undercutting this tool is secured in the planer or shaper in the usual way. It is not necessary to lock the clapper block as this tool operates with a very slight drag on the return stroke. A weak spring holds the swivel block (which contains the tool bit) in cutting position against a substantial lug.

The spindle that forms the lower portion of the body of the tool is inclined backward at an angle of twenty degrees, and as mentioned above, slight movement of the swivel block around this backwardly inclined spindle (actuated by the drag of the tool on the return stroke) gives the necessary clearance for undercutting. Suitable lugs limit the movement of the tool-holding swivel block, and the flat spring (4 in *Fig. 1*) holds the block against the lug in cutting position. This spring is shown in a neutral position in *Figure 1*. It may be adjusted for undercutting on either side of the tool by a slight movement of member 2 and latching same over peg shown. The action of this spring is reversed when cutting on the opposite side of the tool, and an "other handed" cutting bit is used in the opposite side of the holder. By the use of this tool it is possible to do work that would otherwise have to be turned over and set up a second time.

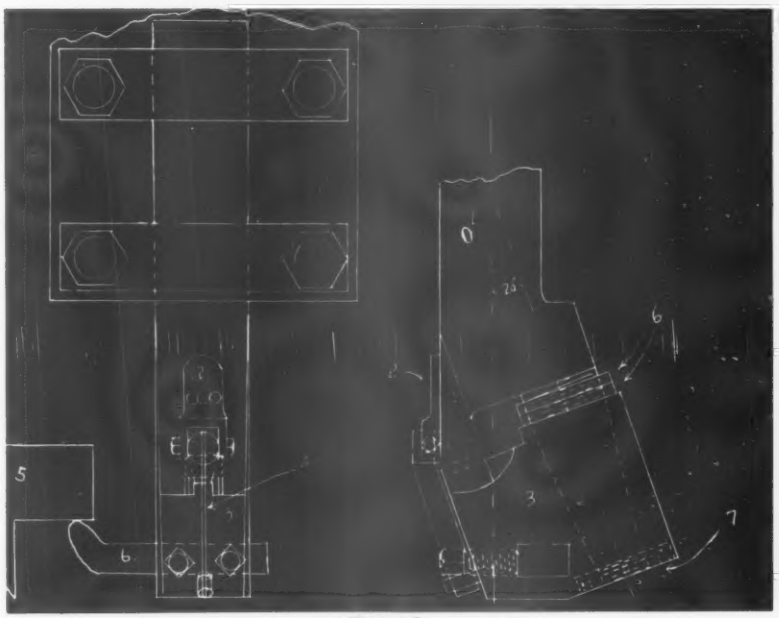


Figure 1
Sketch of planer undercutting tool.

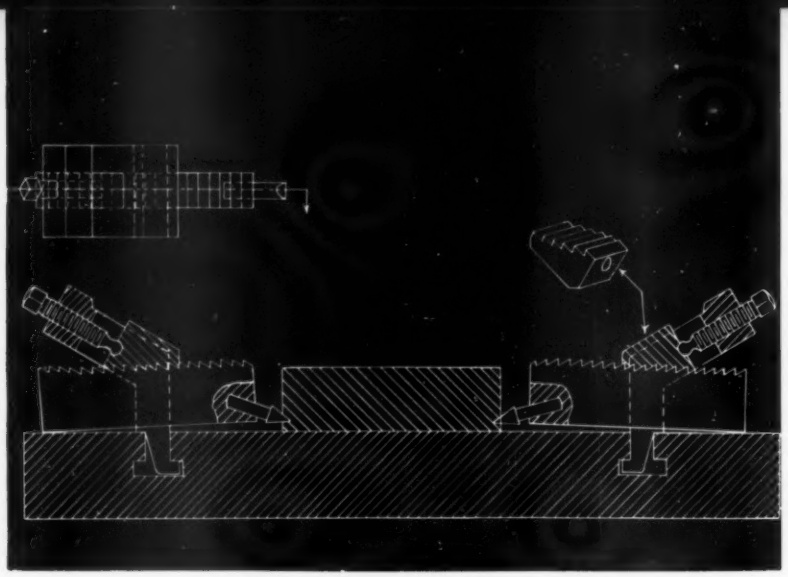


Figure 2—Sketch of Work Holder

Figures 2 and 3 show a work holder for machine tool beds covered by a patent that will expire in a few years. Any one who has ever run a planer will recall that the cuts and feeds are usually limited by the set-up, and that it is seldom possible to work a planer to capacity, especially when the work is held by spikes or toe dogs. The device shown provides a very substantial way of spiking down work on a machine bed. The spikes are short and large, about like stubby one inch flat cold chisels. They will hold down successfully such heavy parts as locomotive guides, rods, etc. The action of the device is apparent from the sectional view (*Fig. 2*). The heavy planer spike is inserted in a hole in the end of a substantial notched bar. This bar is spanned by a yoke that engages the slot of the table. This yoke is made so that it may be dropped in the table slot and engage it. It is not necessary to slide it in place from the end of the table. The yoke is tapped for the screw by which the spike is tightened against the work. The force of the screw is transmitted to the bar and spike through a notched block that fits in the bifurcated portion of the yoke and engages the notches on the bar. These toothed members permit a wide adjustment for length so that variety of work may be held with the same short spikes. One end of the notched bar rests on the table and acts as a fulcrum point, bracing the device against any force tending to raise the work from the table. *Figure 3* shows eight of these work holders used to hold a locomotive guide on the planer table. This device has been found a great improvement over other work holding arrangements on machine tool beds.

Figure 4 shows a spring boring bar, a tool designed to give the advantages of the familiar spring tool sometimes used for turning and threading, to boring and internal threading operations. The spring tool principle is fairly well understood, and several tool companies make "resilient" or "spring" tool holders. These are also called goose neck tools. The most familiar example is the backset planer tool by which broad cuts may be taken without chattering or hogging in. By the use of a backset tool it is possible to plane an inch and one quarter keyway in a locomotive axle using a square nosed tool as wide as the keyway and feeding straight down. The idea is that under strain of the cut the tool will tend to spring away from the work rather than into it. The parts that take the strain are under tension instead of compression and this is one reason there is less tendency to chatter.

Figure 3—Picture of Work Holder (Sketched Above)

The draw cut shaper is a glorified example of the spring tool principle. In this machine the strain of the cut tends to spring the tool away from the work. Cuts and feeds may be used here that would wreck a push cut shaper. The success of the operation of turning locomotive tires under the engine with cutters fixed to the brake beam hangers takes advantage of this principle. The same cutters tend to chatter in the massive supports of a wheel lathe, but cut successfully held by the comparatively flimsy brake head.

Chatter Reduction

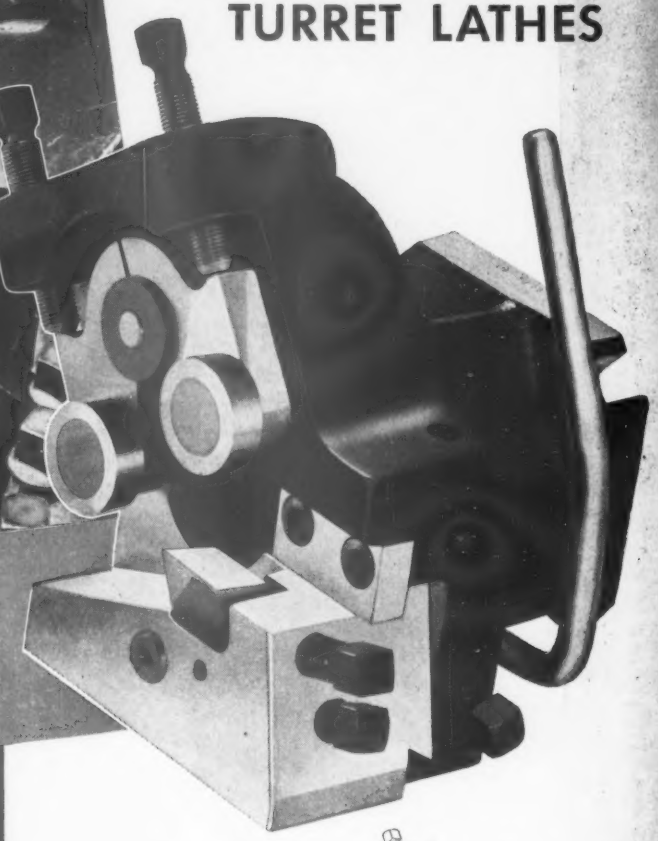
Figure 5 shows how a lathe boring bar may be cut away and slotted so that the tool will have an overhung support, and the inherent advantages of the spring tool. Note that the bar is cut half in two at Y. This reduction in area tends to make the bar resilient and reduces chatter. Experiments have been conducted to reduce chatter by simply necking down the bar back of the cutting tool. The slot X permits further resilient action and makes it a spring tool with true overhung support, advantageous in reducing chatter and tendency to hog in. The advantage of this bar will be appreciated in making long, thin bushings, or cutting glass-smooth threads where steady support of the tool is difficult. There are numerous possibilities for experiment and possible improvements with this type of tool. The slot might be made diagonally across the end of the bar, and the cut-out at Y avoided. It might be a slight advantage to cut out the other side of the bar instead of the side toward the tool as shown at Y.

The possibilities of the draw cut principle to increase production have by no means been exhausted. For example a wheel lathe might be ar-

Get MORE PRODUCTION *from your Old and New* TURRET LATHES

The Job—Machining a worm gear shaft S. A. E. 3135 steel. Using new single cutter turner, a grinding operation was eliminated,

PRODUCTION WAS DOUBLED!



***With the* Single Cutter Turner you can set up and turn within ±.001"—in less than 10 minutes.**

THIS tool (one of 596 improved tools developed by Warner and Swasey) will reduce set-up time and increase cutting speed on bar work. An adjustable cutter block quickly sets cutter size. Its rigidity permits full use of carbide cutters. It takes all the power and speed you can give it—it won't spring under heavy loads. The adjustable rolls help hold accuracy and also produce finer finishes.

Are you taking advantage of these new tools and the other Warner and Swasey Services so helpful at this time? Write—

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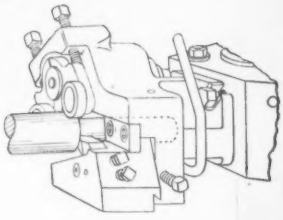
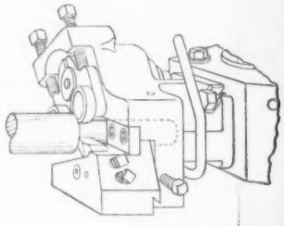
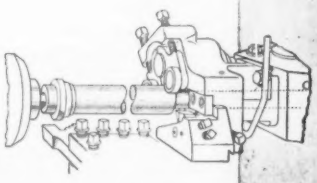


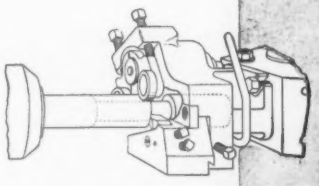
1. Turn a Concentric Diameter—rolls ahead of the cutter ride on a previously turned diameter, producing accurate size and perfect concentricity.



2. Finish Turn to Size in one pass with a deep cut and heavy feed. Rolls behind the cutter burnish the work to a fine finish.



3. The Single Cutter Turner as a steady rest for heavy forming cuts from the square turret — cutter is withdrawn and anti-friction rolls support the work close to the cut.



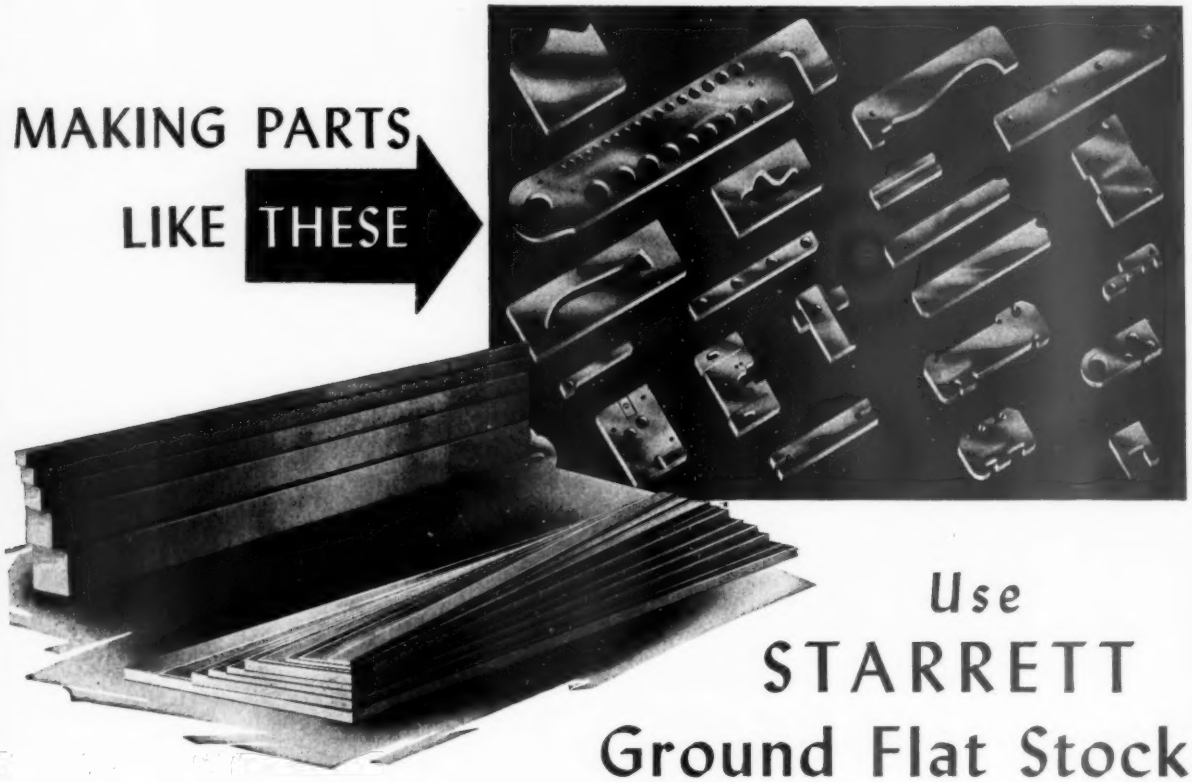
4. Turn a Step Diameter—starting the cutter in a groove machined from the square turret by using the withdrawal lever.

YOU CAN TURN IT BETTE[R] FASTER, FOR LESS ... WITH WARNER & SWASEY TOOLS

STARRETT GROUND FLAT STOCK

THIS IS NO TIME TO WASTE TIME

MAKING PARTS LIKE THESE



Use STARRETT Ground Flat Stock

Don't tie up men and machines grinding stock for small parts, tools, gages, etc. Keep a supply of Starrett No. 495 Ground Flat Stock in the crib. It comes in 18-inch lengths in a complete range of widths and thicknesses. Made of first quality tool steel, cut lengthwise from the sheet, ground to within .001" of size and annealed for easy machining. Each piece individually packaged and marked for quick identification. Write for special Ground Flat Stock Folder "T" and for a handy reference wall chart.

THE L. S. STARRETT CO., ATHOL, MASSACHUSETTS, U. S. A.

World's Greatest Toolmakers

Precision Tools . . . Dial Indicators . . . Ground Flat Stock . . . Hacksaws . . . Metal Cutting Bandsaws . . . Steel Tapes

Starrett GROUND FLAT STOCK

ranged for overhead support of the tools that would probably permit the use of a formed cutter the full width of the tire. A holder operating on the spring tool principle might be arranged for the tire mill that would be an advantage when using broad cutters that tend to chatter with the present set up.

Spherical Turning

In the past very little spherical turning has been done in the railroad shop and when necessary to make ball handles, true joint rings, etc. this work was done free hand to templates. Small work, where great accuracy is not necessary, may be done to advantage this way. A number of ingenious devices for spherical turning on the lathe and boring mill have been designed in the past, most of them requiring a radius rod or else a "former plate" to guide the tool and generate the spherical surface.

There is a wide open field for additional inventions in connection with

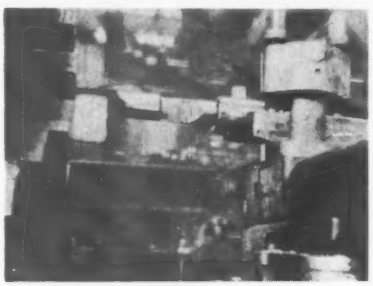


Figure 4
Picture of tool sketched above right.

spherical turning and grinding. Spherical rod bushings are being used on front driver wheel crankpins when the wheels have a lateral motion device. Some convenient means of turning these and boring and grinding the spherical shells is needed. Some of the numerous attachments now used for ball joint turning etc. might be adapted to this job. Some truck boxes have a spherical seat on top, and a spherical brass liner on which the large "dolphin" equalizer rests.

It is of interest to note that it is possible to generate a spherical surface without a radius rod or a template. *Figure 6* shows the principle of a lathe attachment that takes the place of the usual compound rest and causes the tool to move in a circular arc by means of a wedge and two pins. The two pins are fixed to the carriage to which the attachment is bolted. The triangle CDE, on which the tool

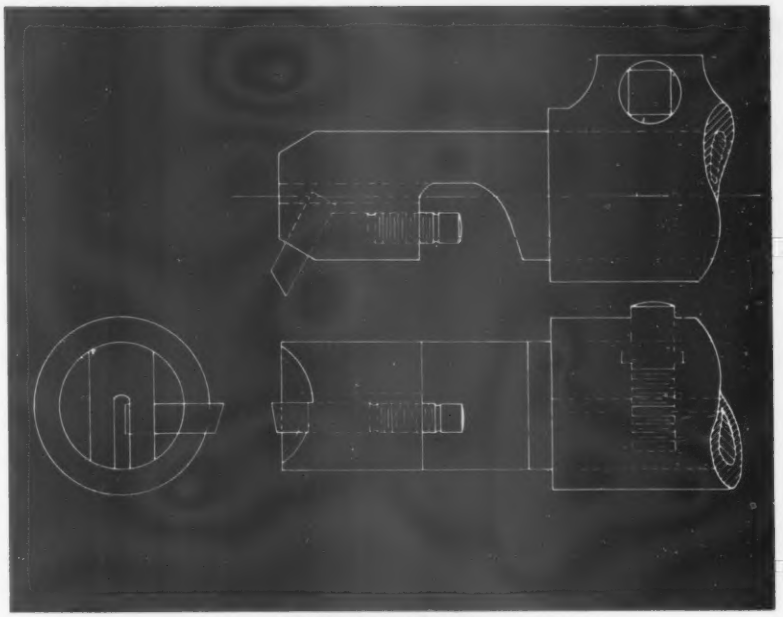


Figure 5—Holding Bar
Slot X indicated by dotted lines in top view, cutout Y at center.

is rigidly mounted, is pushed across the bed by a special handcross feed, and if held snugly against the pins, point P will trace an arc that, within the capacity of the device, is an approximately true circle.

This is the principle of a device used in the optical trade to make the forms used for grinding lenses. It can be quickly set for concave or convex turning, and the radius of curvature quickly adjusted, as easily as setting a taper attachment. The angle of the wedge is changed to form spherical surfaces of various radii within the capacity of the attachment.

This device is used for spherical turning of large radius where a radius rod of inconvenient length would be necessary if this novel linkage were not used. The use of the attachment is limited in that the tool will only move in a small segment of an arc, and it would be impossible to turn a ball or even a hemisphere.

The mechanical realization of the linkage and the details of the complete attachment differ from the conventionalized sketch (Fig. 6) that shows the principle only.

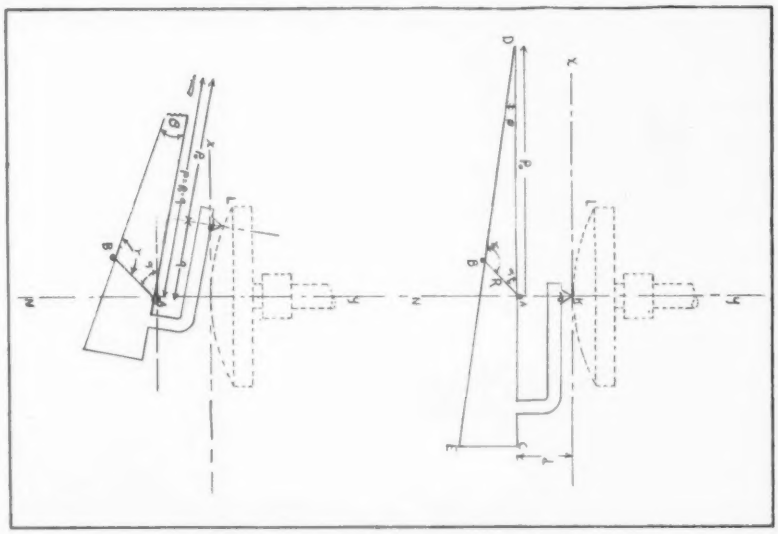


Figure 6—Spherical Turning Attachment
The radius is generated by wedge and two pins.

Easy as pointing your finger

ELIMINATE the work—and the walking—of changing speeds and feeds and you'll find that the operator uses the right speed-feed combination for the job . . . turns out more work . . . better quality work. That's one of the direct benefits you will find in using CINCINNATI Dial Type Millers, for it's as easy as pointing your finger to change speeds and feeds.

While the operator merely holds a small lever in the speed or feed position, the machine does the actual job of shifting gears. The indicating dial clicks around, and there, in a few seconds, you have the desired speed and feed for the work being milled. Practically no effort —and no walking, for selection can be made from the front or rear working position. Catalog M-970 illustrates and describes all the features. Write for your copy today.

Changing speeds and feeds at the front . . . the Dial Type way.

Changing speeds and feeds at the rear . . . the Dial Type way.

THE CINCINNATI MILLING MACHINE CO. CINCINNATI, OHIO, U.S.A.

TOOL ROOM AND MANUFACTURING MILLING MACHINES . . . SURFACE BROACHING MACHINES . . . DIE SINKING MACHINES

Production Perspectives

News of Mass Manufacturing Everywhere

THE Government moved last month to insure ample materials for the completion of the United States' defense plans, and to set up defenses against unjustified increases in the price of new and used autos. Jesse Jones, federal loan administrator, announced at Washington that the Defense Plant Corp. would construct and equip four huge plants for the manufacture of synthetic rubber. The Senate passed a bill giving the OPM sweeping powers, to fix priorities and ration materials for defense needs. Another Senate-approved bill gave the Reconstruction Finance Corp. an additional billion and a half dollars lending power to be used for defense plants and equipment. Leon Henderson, price control administrator, considered action to halt any unjustified increases in the price of new and used cars which might result from mandatory reduction of production of 1942 models. The Defense Plant Corp., it was revealed, has authorized lease agreements for the synthetic rubber plants with the Goodyear Tire & Rubber Co., the Hydro-Carbon Chemical & Rubber Co., a subsidiary of B. F. Goodrich Co.; Firestone Tire & Rubber Co. and U. S. Rubber Co. The plants, which will be geared for initial production of 10,000 tons annually, are expected to remove the necessity of rationing rubber to meet defense needs. Shortage of shipping facilities has made procurement of rubber very difficult.

Cadillac division of General Motors Corp., Detroit, is manufacturing approximately 1000 engines for the Australian government for use in medium tanks, it was learned May 16. The engine consists of three regular Cadillac V-8 cylinder engines of 150 horsepower each, hooked up into one transmission to give approximately 450 horsepower. Cadillac has been in production on the tri-motored power plants for several weeks and already has made some shipments to Australia, it was understood.

Donald M. Nelson, director of purchases for the Office of Production Management, told the convention of the United States Chamber of Commerce at Washington that it was "physically impossible" for the nation to carry on its defense program and continue "business as usual." "This defense program is so tremendous," he said, "that in the way we handle it we shall be shaping our future for many years to come. Whether we like it or not, the program is an instrument of change." Admiral Harold R. Stark, reporting that the naval construction program was running ahead of schedule, asserted that the United States would share its resources to the limits of its security. The statement was made at a luncheon meeting of the Chamber. Earlier, Jesse Jones, secretary of commerce, had forecast that the national debt would rise to at least $90,000,000,000, and warned "we have not yet made any sacrifices, but they are in store for us—plenty of them."

Germany has enough oil to meet her present needs, while Italy's supply is inadequate and Japan's petroleum situation would be "hopeless" if she got into the World War, E. DeGolyer of Dallas, Tex., told members of the National Petroleum Association at Hotel Cleveland, in Cleveland. DeGolyer, an appraisal engineer for the petroleum industry, said the greatest potential oil fields in the world, however, lie in the direction of the Near Eastern campaign of the Axis powers. The fields are in the Iraq area, now controlled by the British. He said it "seems probable that much of the difficulty which the Italians have undergone in both naval and military operations has been due to a real shortage of petroleum and its products." But, he added, "the position of Japan from the viewpoint of securing adequate oil supplies in case she assumes an active role as an Axis partner, would seem to be hopeless."

EFFORTS to further speed defense production in the metal industries were indicated when the International Nickel Co. of Canada, Ltd., world's largest producer of nickel, asked its non-salaried employes in the United States, to accept a bonus of one week's pay instead of the customary week's vacation. The company said it was acting at the request of the Office of Production Management. All employes accepting the offer will receive one week's wages in addition to regular pay. A company statement says "employes who for reasons of health desire a vacation should notify their department superintendent within a week." This proposal affects 1,700 workers at the Huntington, W. Va., plant and 140 at the Bayonne, N. J., works.

The world's largest powder plant—capable of turning out enough powder to fill the needs of a million-man army—started production one month ahead of schedule April 24, the War Department at Washington announced. Located at Charlestown, Ind., the vast plant is one of three built during the present emergency. It covers a 5,500-acre tract and will employ more than 9,000 when it goes into full production by early fall. Ground was broken last Sept. 2. Consisting of

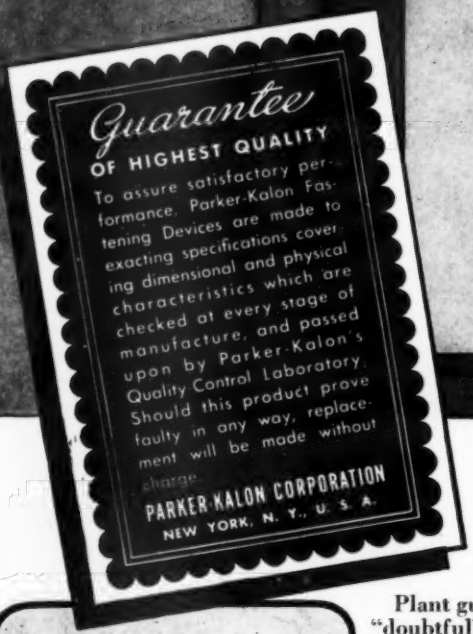
Drawn for THE TOOL ENGINEER by Ted Petok

"Don't be silly, if you are a Tool and Die man, they can't draft you."

IS YOUR ASSEMBLY DEPT.

CLOSED TO SABOTEURS

. . BUT OPEN TO "DOUBTFUL" SCREWS?


Guarantee
OF HIGHEST QUALITY
To assure satisfactory performance, Parker-Kalon Fastening Devices are made to exacting specifications covering dimensional and physical characteristics which are checked at every stage of manufacture, and passed upon by Parker-Kalon's Quality Control Laboratory. Should this product prove faulty in any way, replacement will be made without charge.
PARKER-KALON CORPORATION
NEW YORK, N. Y., U. S. A.

Parker-Kalon's Quality-Control GUARANTEE stands guard against work-interrupting fastening devices!

Plant guards are powerless against "doubtful" screw infiltration. Yet these trouble-makers can sabotage assembly schedules – cause rejected parts – run up costs in a way that's plenty serious!

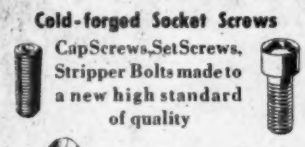
You have one SURE protection against "doubtful" screws . . . screws that *look* right but some of which don't work right. That is the famed Parker-Kalon Quality-Control Laboratory! Without counterpart in the industry, this $250,000 department in the Parker-Kalon plant applies a unique test-and-inspection routine that eliminates "doubtful" fastening devices from your work.

When you specify *Parker-Kalon* you can be sure that *every* screw will be uniformly good in all physical and mechanical characteristics. You can be sure that *every* screw will go in easily and hold securely, even under unusual strains. Parker-Kalon Corporation, 190-198 Varick Street, New York, N. Y.

COSTS NO MORE *to get this Parker-Kalon Quality-Control Guarantee with every box of . . . .*

Hardened Self-tapping Screws
Types, sizes, head-styles for every assembly of metal or plastics

Cold-forged Socket Screws



Cap Screws, Set Screws, Stripper Bolts made to a new high standard of quality

Thumb Screws • Wing Nuts
Cold-forged . . Neater, Stronger

SOLD ONLY THROUGH RECOGNIZED DISTRIBUTORS

PARKER-KALON *Quality Controlled* FASTENING DEVICES

nearly 600 different buildings, the plant is being operated for the army ordnance department by the E. I. du Pont de Nemours Co. on a fixed-fee basis.

The National Machine Tool Builders' Association, with headquarters in Cleveland, has estimated the industry's March shipments at $57,000,000, up from $54,000,000 in February and nearly double the $29,000,000 figure for March, 1940. The association said plant expansion undertaken last fall would bring sharp acceleration by summer towards the 1941 goal of $750,000,000, against $430,000,000 for 1940. Estimates are based on reports from 95 per cent of the defense-spurred industry.

Charles E. Wilson and Philip D. Reed were reelected president and chairman of the General Electric Co. at annual meeting April 25. The officials termed the company's "biggest and most important" defense job the building of propulsion units for navy ships. They said production of turbo superchargers, vital equipment for high altitude aircraft, has been doubled. They also reported progress in manufacture of radio equipment, 800-million candle power searchlights, fire control and other devices. New factories have been built at a cost of $50,000,000. Company has $500,000,000 in orders, 75 per cent for defense. It has been hiring 1,000 employes weekly since Jan. 1. About 105,000 now are on the pay rolls.

ALREADY geared to a productive capacity three and one-third times greater than that of its peak month, January, 1928, Worcester's machine tool industry is giving serious consideration to President Roosevelt's request for a "24-hour day and seven days a week" working program for defense.

The majority of Worcester's tool machinery is now working 120 hours per week—in some cases more—whereas the President wants it at work the full 168 hours of the week.

Manufacturers pointed out that lack of capable help and lack of time for training new help formed the major snag in getting into a 168-hour week, but other factors enter the picture.

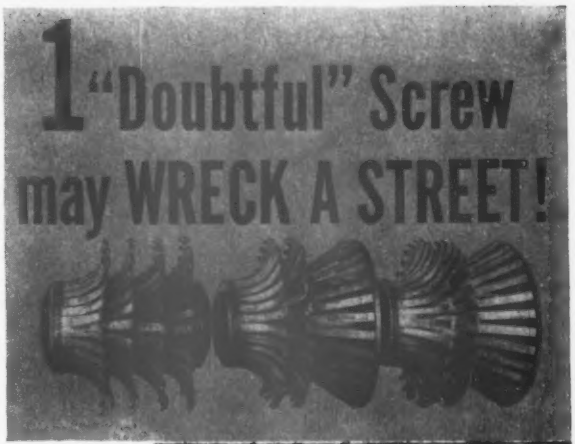
These include materials, transportation problems, operating hours of contributing industries which, they said, must be carefully studied. Tool manufacturers are of the opinion that the Worcester machine industry, perhaps more than in any other section of the country, has kept pace with national defense work through plant expansion, jumping from one to three shifts, and keeping up on delivery dates.

The nation defense program, with its continuous call for labor has brought new hope for men over 40, George A. Mohlman, vice president of Package Machinery Co., Springfield, Mass., declared in pointing out that this group of workers is forming the backbone of the program.

"The older man is being rediscovered and sought after. Men of 60, 70 and even 80 years of age are being called from retirement back to work. It has taken years and a national emergency to bring about a change from the emphasis on youth, but this time the older man is here to stay," Mr. Mohlman said.

The new attitude of personnel managers is significant, he said. Older men are not being rehired merely because of the labor shortage. They are preferred. Proper value is once again being placed upon training and long experience, upon ability to meet emergencies and responsibilities. Personnel men are discovering that even the old bugaboo of speed upon which they based their objections to oldsters is false. The majority, lacking the speedy movements of the younger man, still equal his production by the steadiness of their pace, and in many cases out-work him.

Dedication of the Resinox plant of the Monsanto Chemical Company in Indian Orchard, a four-story structure costing approximately $1,000,000 took place in the presence of high company officials and more than a score of invited guests last month.



So ONLY Parker-Kalon Quality-Controlled Socket Screws go into this Underground Pipe Cleaner

In cleaning forty inch water mains, enormous strains are put on the 840 Socket Head Cap Screws which hold the blades on this ingenious tool. It's no place for "doubtful" screws, as the Flexible Under-Ground Pipe-Cleaning Co. of Los Angeles makes clear:

"Before adopting *Parker-Kalon* we had two sorry experiences. Some screw heads popped off causing blades to jam the tool in the underground line . . . to retrieve the tool, which is shot 2000 to 3000 feet with no cable connection, we had to dig up the line in the middle of a boulevard."

It is the final test of actual service like this that proves the practical value of Parker-Kalon's unequalled Quality-Control routine. Every design and production man who seeks protection against "doubtful" screws – screws which may look okay but of which a percentage fail in use – will find that protection in Parker-Kalon Screws. Want samples for test? Write: Parker-Kalon Corp., 190-198 Varick Street, New York.

Quality-Controlled

16-point test and inspection routine covers: Chemical Analysis; Tensile and Torsional Strength; Ductility; Shock Resistance under Tension and Shear; Hardness; Head diameter, height and concentricity; Socket shape, size, depth and centricality; Class 3 Fit Threads; Clean-starting Threads.

PARKER-KALON
COLD-FORGED
Socket Screws

A variation of the quiz published in the May TOOL ENGINEER, this quiz, which was held in Los Angeles, is so arranged that the reader may pause and test his own knowledge before reading ahead to find the answer given.

A Practical Tool Engineering Quiz

By H. F. LENZ
Chief Engineer, National Machine Products
Los Angeles, California

A "Tool Quiz," held at Los Angeles on February 13, disclosed a promising field for the gathering of information not generally uncovered in the course of ordinary meetings. A list of questions was prepared by the writer, covering a wide field of tooling information such as jigs, dies, gages, heat treatment, tolerances, shrinkage allowances, and tool drawing specifications.

To add zest to the program, two teams of three members each were appointed, one representing the aircraft industry, and the other made up of tool sales engineers. Questions were asked the team members in alternate order. If an answer was not started in six seconds, the question was referred to the audience for an answer. Because of the limited time all questions which developed differences of opinion over the first answer or the prepared answer were classed as controversial and debate was postponed to a later date.

Submitting the benefits to be derived from a "Tool Quiz," the following points were emphasized:

1. A brushing up on facts once known but forgotten.
2. A test of one's ability to express an idea in the fewest words and in the most direct fashion.
3. Development of public speaking ability and encouragement in independent thinking.
4. Compilation of valuable knowledge gained in specialized branches of tool engineering for publication in our official magazine.

The following questions were asked and the prepared answer is given along with such comment as the succeeding discussion may have merited:

1. What precautionary measure should be observed when calling for a tight, hardened and bottomed dowel in a member, where the possibility exists of having to remove it?

Answer: A small hole should be drilled thru beyond the dowel seat so the dowel can be driven out from the rear.

2. What is the most common shop complaint of so called "cheap" aircraft drill jigs?

Answer: Lack of chip room because the work is placed directly against the drill plate.

This answer was generally accepted as correct, though some members held that lack of planning for the removal of the work was the greater sin.

3. What would you say was wrong with the design of a drill-jig in which the work is clamped against a ⅝ inch thick plate containing a head-less drill bushing ½ inch long pressed flush with the top of the plate?

Answer: The drill bushing being shorter than the drill-plate leaves a pocket into which chips are crowded.

4. What reason can you give for an advocated practice of making a drill bushing larger than the drill when drilling magnesium alloy without a cooling medium?

Answer: When the bushing and drill are a close fit the abrasive action causes excessive expansion of the drill and subsequent galling of either drill or bushing.

This question drew considerable comment as the extensive drilling of magnesium alloys in the aircraft industry has developed many drill problems.

5. In the design of a drill jig with a fixed drill-plate in which it is planned to drill, ream, and spot face a hole, what precautionary measure should be observed?

Answer: The hole in the liner bushing should be larger than the diameter of the spot facer.

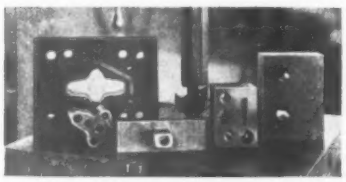
6. Given the design of an Oil-Pump Body with (3) 1.252 plus .002 minus .000 holes (two of which are blind) spaced 1.000 plus .001 minus .000 apart, what type of boring fixture would you design?

Answer: A boring fixture with one fixed bushing superimposed over a sliding plate to which the part is clamped. The sliding plate to be registered in three positions with an indexing pin.

This question was answered substantially correct, but conflicting

DoAll Works like Magic

8 HOUR JOB IN 1½ HOURS—Drill Fixture cut from a solid piece in less than 1/5 former time. Note, slug is salvaged.



20 HOURS' WORK IN 6 HOURS—By former method of drilling, slotting, shaping and milling, these parts would have taken 20 hours. DoAll did it in ⅓ this time.

DO-ALL Contour Machine BAND SAWING BAND FILING BAND POLISHING

FREE — Literature and technical data on Contour Machining.

● The parts shown above were cut in one eight-hour day on the DoAll. At least five days would have been required by drilling, shaping, milling and boring.

The DoAll enables Gonda to make excellent deliveries to their customers; also releases the other machines for work more suited to them.

Today every plant where metal is used, needs the DoAll Contour Machine to get work through on schedule.

One of our factory trained men will call at your plant to show you what a DoAll can save for you. Don't delay—Write today!

Band Filer

Does faster, better, smoother continuous filing on all materials from high-carbon steel to brass, wood, etc. Your choice of 23 styles of file bands, ½", ⅜" and ¼" wide, flat, oval or half round.

DoAll Grinder

A super precision surface grinder — a real production tool. Less vibration because motor is built right on the ball-bearing spindle. Work table has exceptionally large bearing surface. Hydraulic table travel is infinitely variable, up to 50 f.p.m.

CONTINENTAL MACHINES, INC.

1304 S. Washington Ave. **Minneapolis, Minn.**

Associated with the DoAll Co., Des Plaines, Ill., Manufacturers of Band Saws and Band Files for DoAll Contour Machines

opinions demanded that it be placed on the deferred list.

7. In making allowance for the length of a bend in a forming die, at which portion of the stock thickness should the developed length be calculated?

Answer: One third of the thickness from the inside edge of the stock.

This question was answered from the floor after considerable begging.

8. What is meant by the shut-height of a punch press?

Answer: The distance between the bed and slide with the stroke down and adjustment up.

This question was answered substantially correct, except that the press adjustment was given as "down."

9. What is a "Cam" die?

Answer: A die which has some intervening mechanism between the punch and ram.

The answer received was a "die for making a cam."

10. What is the difference between liquid carburizing and pack-hardening?

Answer: Liquid carburizing is the process of immersing a piece of steel in molten salts high in carbon. Pack hardening is a method of packing the steel in carbonaceous material and subjecting it for a period of time to high temperature.

This question developed a startling lack of differentiation between these two methods of surface hardening.

11. What is meant by "developing" a blank?

Answer: The process of carrying approximate shapes through the bending or forming operations until the true shape of blank is arrived at which will make the desired final form.

The answer received, while substantially correct, was a good example of word extravagance considering the amount of explanation involved.

12. What part of a die is sheared when making a blank?

Answer: The die.

The answer received was wrong as the respondent believed the punch was sheared.

13. When punching a hole, which part of the die is sheared?

Answer: The punch.

14. How many turns of the index crank are required on most dividing heads to make one turn of the spindle?

Answer: Forty turns.

15. If a dividing head requires forty turns for one turn of the spindle, through how many degrees of arc will the spindle move if the index crank is given one turn?

Answer: Nine degrees.

Considerable patience and some head-scratching finally brought forth the correct answer.

16. What gage is used for measuring Brass Sheet?

Answer: American or Brown & Sharpe.

The answer received was "U. S. Standard."

17. Which is the harder, a No. 5 or a No. 1 temper cold rolled steel sheet?

Answer: The No. 1 temper sheet.

18. What type of edge on a strip steel is classed as No. 2?

Answer: A natural round edge.

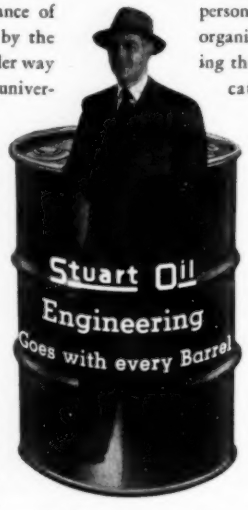
The answer received was "shearing edge".

19. Which four views of a die-set

ARE YOU OVERLOOKING THIS POWERFUL PRODUCTION TOOL?

The problems of increased production are so many and varied that simple solutions are often hidden and difficult to perceive.

Obviously, it is necessary to squeeze every ounce of production efficiency from existing tools and machines. This can best be accomplished when cutting fluids are seriously recognized as a factor of prime importance. Perhaps you have overlooked the useful developments in the field of cutting fluids that have accompanied improved machine and tool designs. The importance of such developments is evidenced by the interest in intensive research under way in the laboratories of leading universities and machine tool manufacturers.



When a plant door is unwittingly closed to the results of scientific progress in the field of cutting fluids and cutting fluid applications, its production executives are neglecting to use a valuable and immediately available working tool.

As a production executive interested in getting more out of existing tools and machines, by eliminating such superfluities as tradition, reciprocity, etc., will you consider the following suggestions? They may solve your problems.

WHAT YOU CAN DO ABOUT IT!

1. Encourage your purchasing agent to consider bona fide new cutting oil developments. Ask him to open the door wide to the qualified vendors possessing the all important credential of well founded information on the lubrication problems of today.

2. Remind your factory manager, superintendent or test engineer that the policy of trying out well recommended cutting oil products can be of vital importance and may quickly open up bottlenecks in the road to increased production.

3. Suggest to your metallurgist that machinability troubles can frequently be cured by getting the right cutting oil to fit the job, preferably selecting one with a sufficient factor of safety to provide for occasional metallurgical irregularities.

4. Inform your tool engineer that when deliveries of small tools are slow or difficult to obtain, it may be that the opening of the door and the help of a qualified cutting oil engineer may prolong the life of the tools on hand, thereby reducing appreciably this particular bottleneck in a quick and simple way.

WHAT WE CAN DO ABOUT IT!

1. We can through an informed and alert personnel immediately present to your organization timely information covering the most efficient cutting oil applications for ALL metal cutting operations. At the present time the problems involved in the manufacture of gun barrels and mechanisms, military tanks, ammunition, airplane engines and other similar items are, because of the emergency, particularly important.

2. We can present to you complete cutting oil research facilities, together with broad practical experience gained from working hand in hand with the manufacturers of small tools, builders of machine tools and makers of alloy steels.

3. We can give you the benefit of years of experience in supplying cutting oil products and cutting oil engineering service to the largest consumers in the most highly competitive industries. We are today providing government manufacturing plants (armories and arsenals), airplane engine builders, and the earlier manufacturers of munitions with a quality of cutting oil products and a specialized cutting oil application service that saves tools and speeds up production.

YOU OPEN THE DOOR—WE WILL SERVE YOU WELL

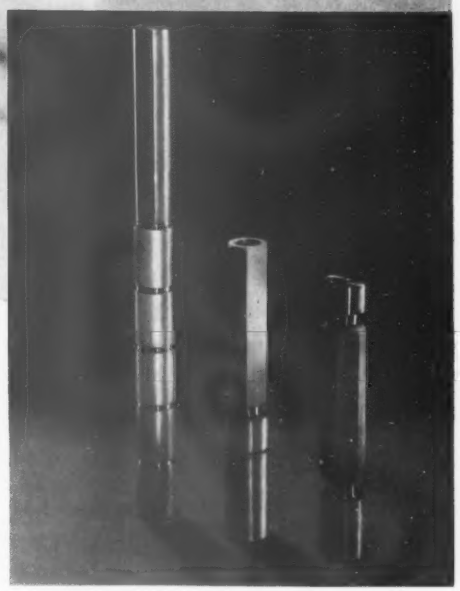
D. A. STUART OIL CO.
LIMITED • Est. 1865
2727-2753 SO. TROY STREET • CHICAGO, ILL.
Warehouses in Principal Metal Working Centers

No. 3 IN THE SERIES OF LINCOLN PARK *Firsts*

Ten Years Ago

THESE WOULD HAVE BEEN

Scrapped



NOW THEY'RE

Salvaged

BY CHROME PLATING

Lincoln Park pioneered the use of hard chrome plating for the salvaging of gages and non-cutting precision tools.

In the salvaging processes employed by Lincoln Park today, gages and other non-cutting precision tools are prepared for plating, are hard chrome plated and then finished—usually at a fraction of their original cost. Special emphasis is always placed on proper preparation to assure the best final results. After going through this thorough process of salvaging, these gages, tools and parts have a service life that, in most cases, far exceeds the original period of service.

Salvaging of gages and precision tools and parts by chrome plating is no longer an experimental process. Neither have new methods and applications been exhausted. Developments now in progress at Lincoln Park will further establish this company as the undisputed leader in this field.

LINCOLN PARK TOOL and GAGE CO.

LINCOLN PARK, MICHIGAN

in a shop drawing most clearly show its construction?

Answer: A plan view of die and shoe, a front plain or sectional view of punch and die, an end view of punch and die, and a plan view looking at the front of the punch holder.

A variety of answers were shot forth, some contending the top view most important, others the cross-sectional or front elevation. When the respondents were tied down to the original question of four views it proved controversial enough for an extended session later.

20. What is a "Die Sweep" used with continental process dies?

Answer: An arm attached to a swinging stock rack which moves the die back and forth under the press slide.

21. What is a "Continental Process Die"?

Answer: A die in which an unsupported punch under impact is guided into the die by a close fitting plate mounted over the die aperture.

The answer received, while substantially correct, was another good example of what not to say in the fewest possible words.

22. What is the difference between an "open" and a "closed" die?

Answer: An "open" die is one without guide pins to control the alignment of punch and die. A "closed" die has "guide" or "leader" pins.

The extent of the answer received was that a closed die had "leader" pins.

23. What is the class fit number of the National screw thread system for a "Wrench fit"?

Answer Class *5*.

This question developed quite a controversy. Some said a Class *4* fit. Others said there was no difference between a Class *4* and a Class *5* fit. Others denied the authority of a Class *5* fit claiming it was still a tentative standard.

24. To what class of fit are the nut ends of coarse thread studs finished?

Answer: Class *2*.

25. To what class of fit are the stud ends of studs usually finished?

Answer: Class *5*.

The answer received was class *3*. A voice from the audience said there was no class *5*, putting the whole matter in the haze developed by question number 23.

26. What is the general practice for the number of allowable turns for a "not-go" thread plug gage?

Answer: Not more than one and one-half turns.

The answer received was "two."

27. What do the letters N. S. indicate on a thread gage?

Answer: National Special thread of American National form.

The answer received was "National Pipe."

28. Is a thread micrometer dependable for checking the pitch diameter of a thread plug gage?

Answer: No. A wire measurement should be taken.

29. What do the three flats on a pipe plug gage signify?

Answer: Maximum, basic, and minimum size.

The answer received was, "One thread sheared short. One standard. The other extra long."

(Continued on page 66)

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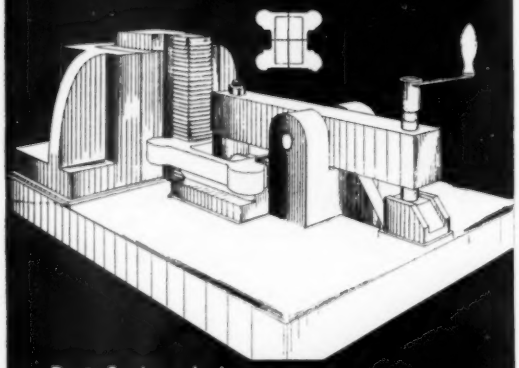
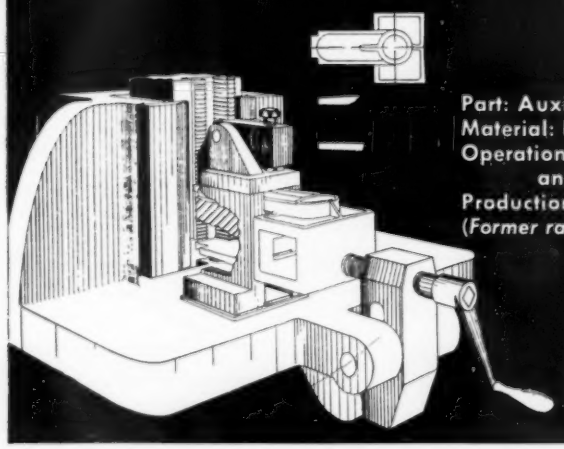
BROACHING PAYS

Part: Shackle bolt
Material: Machined steel
Operation: Broach ½ round, 2 at a time
Production: 160 per hr
(Former rate by milling: 50 per hr)



Part: Spring chair
Material: Rough malleable casting
Operation: 1. Broach slot sides
2. Broach slot opposite sides
Production: 60 pcs. per hr
(Former rate by milling: 15 per hr)



Part: Auxiliary spring chair
Material: Rough malleable casting
Operation: Broach both sides upper and lower arms in one pass
Production: 45 per hr
(Former rate by milling: 14 per hr)

. . . ONE BROACHING PRESS *with* 7 *different* FIXTURES *processes* 7 *different* PARTS *in* 60 *different* SIZES

Job-lot processing by broaching *is* profitable. Both initial cost of equipment and cost of processing can be reduced compared with milling—with the added advantage of increased productive speed, so important these days when productive facilities are heavily taxed.

In one well known plant, a single Colonial Utility type Press of 15 ton capacity and 36 inch stroke has supplanted milling machines for processing—

(1) Seven different trailer parts, in

(2) Sixty various sizes, in

(3) Job lots usually ranging from 300 to 1000 parts, at

(4) One-fourth the previous processing cost per piece, and

(5) With an initial equipment cost of one-fourth of former milling machines including the necessary fixtures, at

(6) *Three to four times the former productive rate per hour, including change-over time.*

COLONIAL BROACH COMPANY

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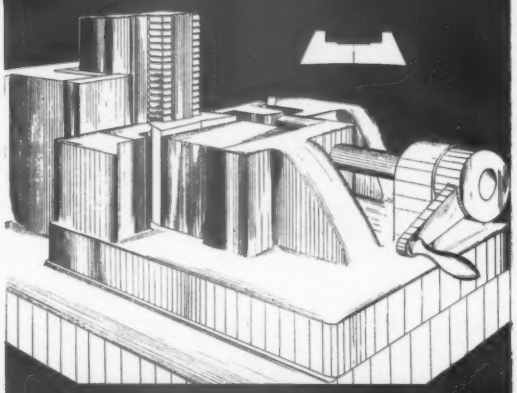
DETROIT, U. S. A.

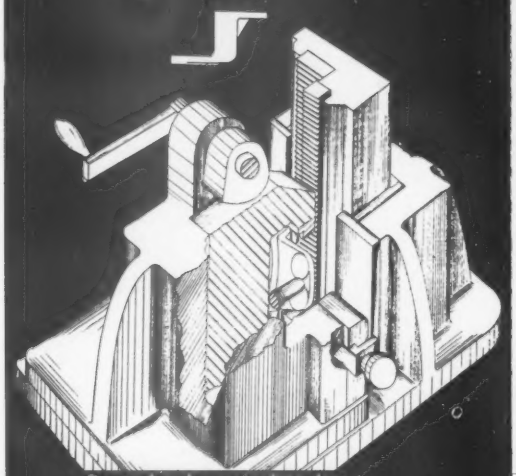
FOR JOB-LOTS TOO

Yes, broaching machines are both high-production and flexible job-lot tools. For different parts, only the fixtures need be changed. The design of the platens, columns, beds are such that quick replacements can be made,—insuring minimum set-up time.

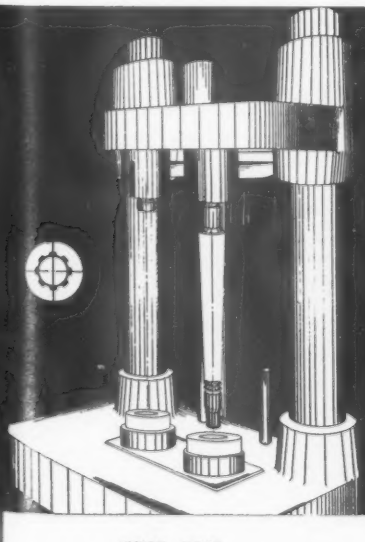
When small lots in a variety of forms or sizes must be processed quickly and inexpensively, Colonials with the right fixtures are proving the answer. Colonial has a corps of engineers at your service, and welcomes the opportunity of applying their specialized knowledge of job-lot production problems to your machining requirements.



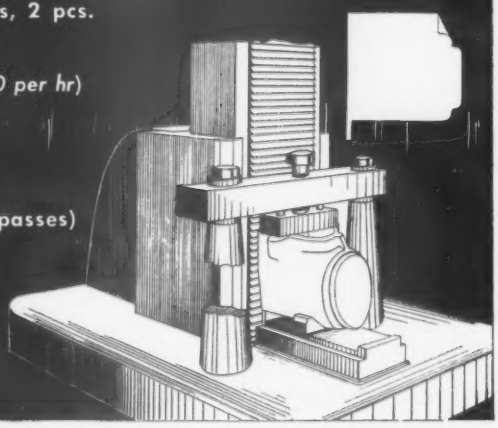
Part: Spring chair
Material: Rough malleable casting
Operation: Broach inner face
Production: 45 per hr
(Former rate by milling: 14 per hr)



Part: Anchor pin bracket
Material: Rough malleable casting
Operation: Broach two faces
Production: 50 per hr
(Former rate by milling: 10 per hr)



(Left) Part: Slack adjuster gear
Material: Machined steel
Operation: Broach internal splines, 2 pcs. at a time
Production: 200 per hr
(Former rate by single pull broach: 50 per hr)



(Right) Part: Gear housing
Material: Malleable iron casting
Operation: Broach 2 faces (2 passes)
Production: 40 per hr
(Former rate by milling: 10 per hr)

30. Which class of plain gage is finished to closest limits and finish; a class "X", a class "Y", a class "Z", or a class "XX"?

Answer: A class "XX".

The question was answered correctly after some buzzing among the team members.

31. If a comparator has a lens magnification of sixty-two and one-half to one, how large will the image of a hair .004 in diameter be on the ground-glass?

Answer: One-quarter of an inch in diameter.

Apparently the higher branches of mathematics were reviewed because after a judicious wait the correct answer was given but with much trepidation.

32. What is a matrix-mounted punch?

Answer: A punch anchored in the punch-pad with a fusible alloy.

The answer received was, "A punch mounted on a type of lead base. You might call it a cast-in punch."

33. What is "Kirksite" and how is it used?

Answer: It is a cast fusible alloy commonly used to make forming dies and punches for limited production.

The answer received was, "A material developed for the aircraft industry with a low melting point used for making drop arm punches."

34. What is an N. S. T. C. standard?

Answer: The standard of the National Screw Thread Commission.

35. What does A. P. I. on a gage signify?

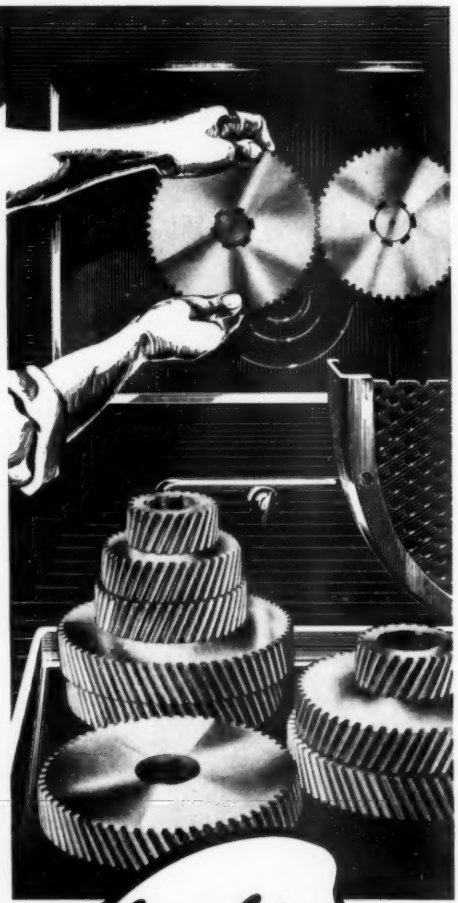
Answer: That it is a standard of the American Petroleum Institute.

36. What does A. A. R. on a gage signify?

Answer: That it is a standard of the Association of American Railroads.

The reaction to this "Tool Quiz" has been most gratifying and, while the few questions it was possible to present in an over-scheduled meeting have uncovered no startling wealth of tool data, it is believed that with active cooperation this idea can be developed into an entertaining and informative feature.

A Simpler CHANGE GEAR SYSTEM



One cover to remove, four gears to change — all at one accessible location on the end of the machine.

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College Course in Tool Engineering

Details of a proposed general curriculum for college courses in Tool Engineering were released recently by the American Society of Tool Engineers.

The curriculum which is already under consideration by several Universities and Engineering Colleges is designed to place the science of Tool Engineering on the same fundamental basis as Mechanical, Civil, and Electrical Engineering, etc.

Included in the course are 'normal' subjects as: Chemistry, algebra, English, drafting, trigonometry, etc.

In addition there are courses in: Military science, forging, heat-treating, welding, materials of engineering, foundry practice and pattern making, principles of metallography, elementary and advanced machine shop practice, cost accounting, metallography of special alloy steels, time and motion study, machine shop equipment, jig and fixture design, finishing processes, wages and compensation, production control, materials handling, die design, cost and production estimating, budgets and planning, resistance welding, and maintenance and millwriting, etc.

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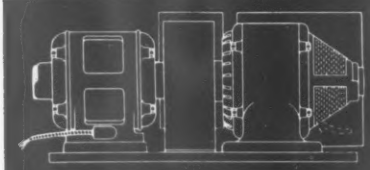

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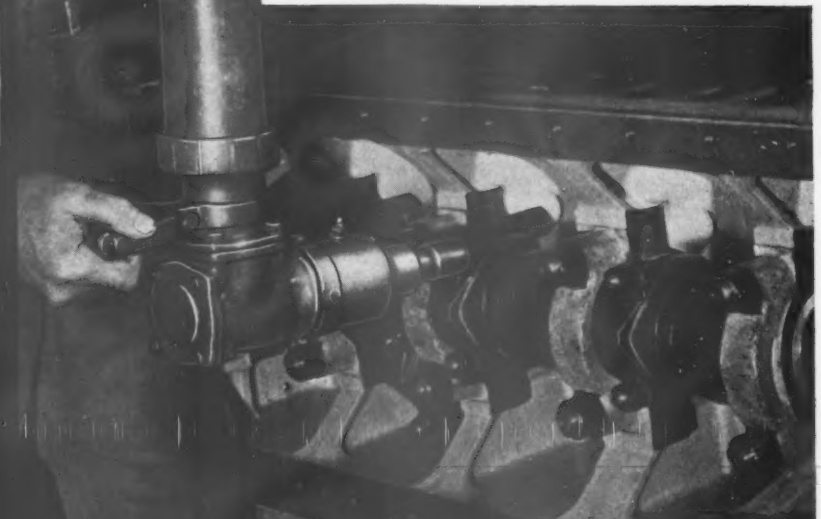

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Material Improvement In Training Activities Reported

NATION-WIDE reports from regional committee chairmen of the Emergency Defense Training Committee of the American Society of Tool Engineers, this month indicate material improvement in the status of training activities nationally, according to O. W. Winter, National Committee Chairman. The technical society is cooperating with governmental and educational bodies and industry nationally and locally in attempting to improve the situation by advising or improving organization and direction of training programs. In some cases, local bodies have found it necessary to request the A.S.T.E. to go beyond its objective of assisting local committees in an advisory capacity.

In a few localities, rivalry between local bodies seeking domination of training programs is mitigating seriously against providing adequate facilities according to Mr. Winter. In others excellent cooperation between industry, educational and governmental bodies has permitted, through the advisory cooperation of the A. S. T. E., the setting up of programs more nearly adequate to meet future and current requirements.

Following are current reports from major industrial sections of the country:

BALTIMORE: All existing training facilities being used to the utmost and additional ones being provided according to John Buckley, Regional Chairman of the A.S.T.E. Committee. Opinion is that future needs will be extreme and that present needs are greater than the current shortage of 700 men reported by the State Employment Service.

BINGHAMTOM: Adequacy of local training situation extremely uncertain with industry carrying the entire load.

BOSTON: A committee of educational authorities, government representatives, manufacturers' representatives, and A.S.T.E. members is being formed under the sponsorship of the A.S.T.E. to improve handling of the training program. According to J. B. Savits, Regional A.S.T.E. Chairman, the outlook for the future appears very promising although still uncertain.

CENTRAL PENNSYLVANIA: Training facilities being fully utilized and more being provided. Situation under complete control, with York particularly active.

CHICAGO: Situation uncertain.

CINCINNATI: New plant of Wright Aeronautical Corporation expected to create a bad labor shortage in the near future, in spite of the tremendous training activity being carried on, according to William Frederick, A.S.T.E. regional Chairman. Importation of labor will probably have to continue.

CLEVELAND: Training activity extensive but probably inadequate for future requirements, according to Roy Bender, Cleveland A.S.T.E. Regional Chairman.

COLUMBUS: Current shortage of machinists and tool makers expected to get worse. A.S.T.E. "industry survey" not quite complete. Indications are that additional training facilities will be

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No. 18 Blanchard with 6" extended column for work 18" maximum height.

Miscellaneous parts like these are a "natural" for Blanchard Grinders.

Routing miscellaneous parts in small quantities is a problem in any plant—until they come to Blanchard Surface Grinders. "A decided money saver" is what the manufacturer of these pump parts called his No. 18 Blanchard. This is a machine designed not only for production, accuracy, and fine finish, but for quick changeover from job to job. Chucking the work is made easy by the Blanchard One-Piece Steel Magnetic Chuck. Convenient controls make the setting and operation of the machine quick and almost effortless. If you decide to put a "money saver" in your plant, write to Blanchard to find out just what these savings will be.

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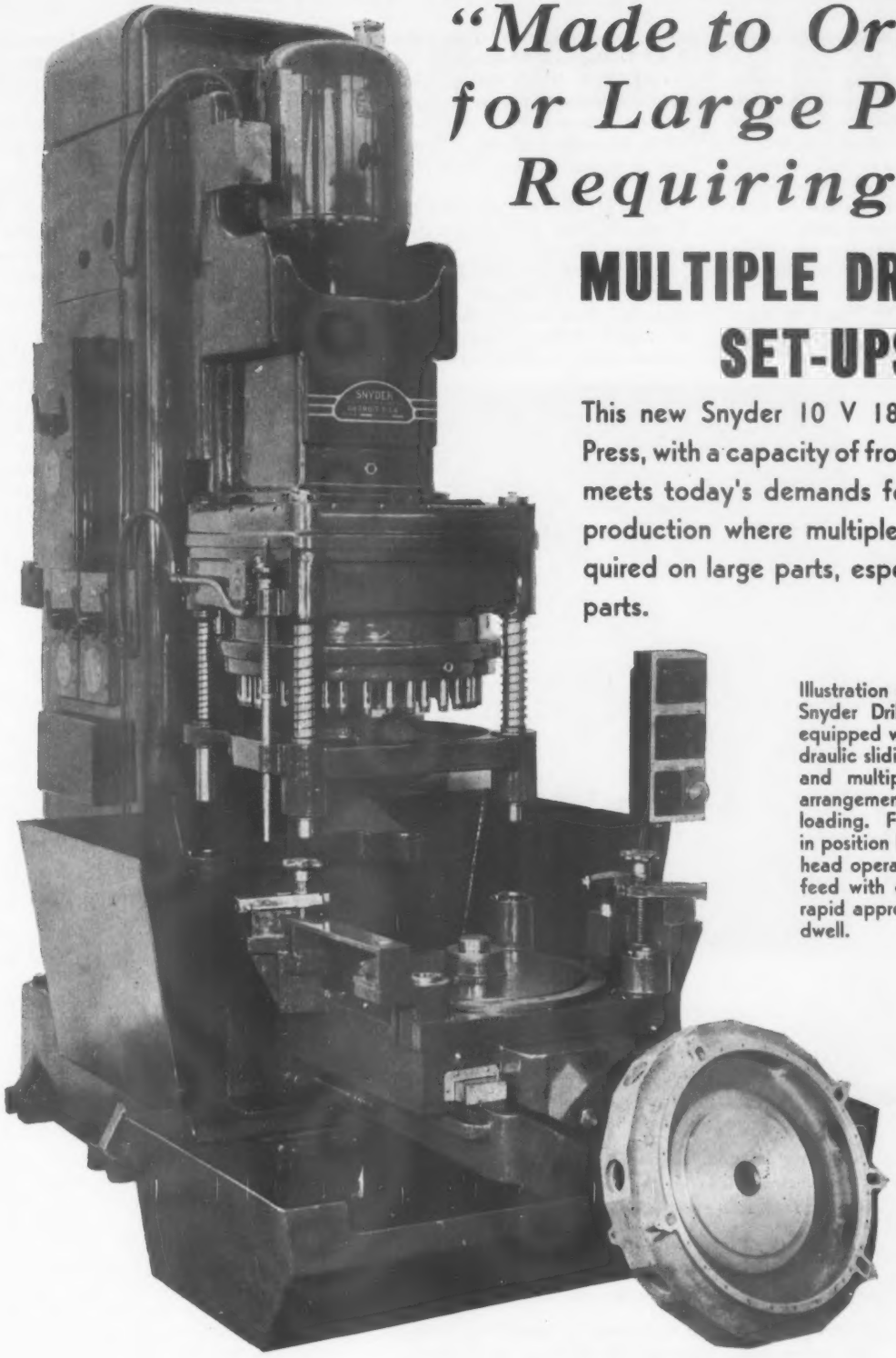

Illustration shows the new Snyder Drilling Machine, equipped with special hydraulic sliding type fixture and multiple head. This arrangement permits easy loading. Fixture must be in position before multiple head operates. Hydraulic feed with conventional rapid approach, feed and dwell.

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needed in addition to those already being fully utilized.

DAYTON: According to George Goodwin, A.S.T.E. Regional Chairman, training activity appears to be adequate in this area to meet industry's needs.

DETROIT: Situation still uncertain, partially due to lack of information of the extent to which automotive labor will be usable on defense work.

ELMIRA: Training activity encouraging but may not prove entirely adequate.

SAN FRANCISCO: Needs of industry decidedly in excess of training activity, according to Carl Horack, A.S.T.E. Regional Chairman.

GREATER NEW YORK: Considerable uncertainty both as to industry's future requirements and as to the availability of training facilities. Little success in organizing cooperative effort reported.

HARTFORD, CONNECTICUT: Fred Woodcock of the A.S.T.E. reports training situation satisfactory.

INDIANAPOLIS: Politics apparently retarding effectiveness of training program. Most serious shortage is in the higher skilled occupations of machinists, tool makers, tool designers and Tool Engineers. Upgrading training to fill such shortages apparently inadequate.

LOS ANGELES: Intensive training under way, and with the early start, situation reported satisfactory.

NEW YORK - NEW JERSEY: According to Frank Oliver, regional A.S.T.E. committee member, industry's requirements will probably be tremendous in the near future. While there is considerable training activity, its adequacy is questionable.

PEORIA: Situation uncertain but hopeful, with O.P.M. district panel on "training within industry" cooperating.

PHILADELPHIA: Training program well organized and keyed to current and contemplated needs, due to early start with A.S.T.E. active in defense training.

PITTSBURGH: Situation uncertain. O.P.M's Training Within Industry Division, Chamber of Commerce and Board of Education cooperating with A.S.T.E. however.

ROCHESTER: Training activity extensive and apparently adequate.

ROCKFORD: Situation uncertain.

ST. LOUIS: Doubt of adequacy of training activity to meet local needs expressed by Burnside, local A.S.T.E. Chairman.

SCHENECTADY: Training activity apparently adequate and keyed to definitely known industrial requirements, according to A.S.T.E. regional chairman, Bernard Tang.

SOUTH BEND: Stanley Cope, A.S.T.E. regional Chairman, reports situation under control and training activity adequate.

SPRINGFIELD, MASS: Situation uncertain, though some training activity is going on.

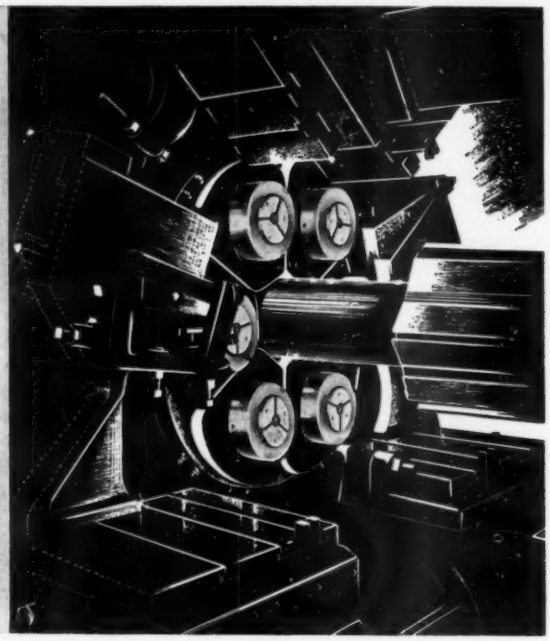
SYRACUSE: Survey of industry shows current shortage of skilled labor. Adequacy of local training program uncertain.

TOLEDO: Local training facilities being used to the maximum extent, according to Lloyd Kelley, A.S.T.E. regional Chairman, with many members of the A.S.T.E. engaged in teaching and active on defense training staffs and committees. Industrial requirements, however, promise to be tremendous.

MOLINE: Adequacy of training activity to meet industrial requirements still uncertain for the future. Shortage of Tool Engineers is to be met by a training course at Iowa University sponsored by the local A.S.T.E. Committee.

WESTERN MICHIGAN: Situation uncertain.

WORCESTER: Current shortage of 1,000 men with future needs expected to be vastly higher. Adequacy of training program uncertain but hopeful.



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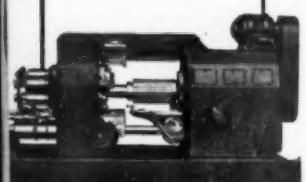

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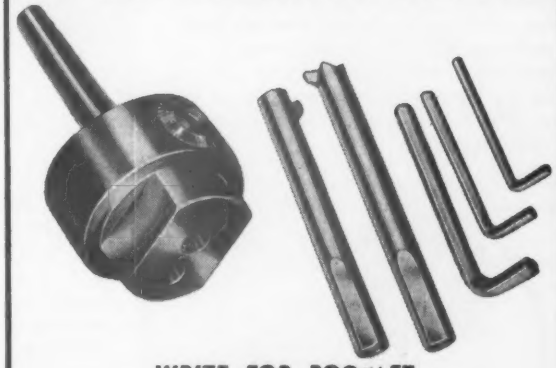

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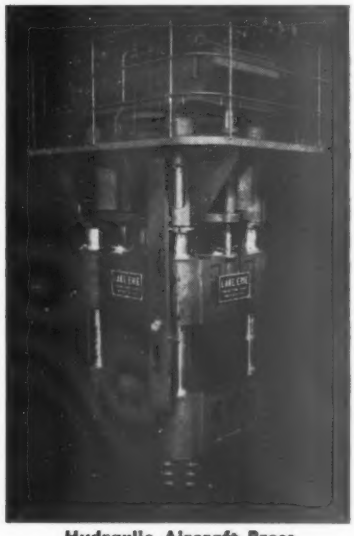
A new 5,000 Ton Single Action Hydraulic Aircraft Press, furnished with rubber pad and steel bolster together with automatic motorized loading tables for high production of aircraft parts is announced by the Lake Erie Engineering Corporation, Buffalo, N. Y. This press is self-contained with pumping unit located on top.

The standardized design of this press has wide applications in the metal forming field. It combines fast operation, low cost dies, quick changeover of dies, quick handling of stock and finished pieces, convenient control of pressure, —all of which result in high output and low costs on volume and limited production.

Push button Controls are grouped in conveniently located panels quickly accessible to operators. When two or more men are operating the press, controls interlock for safety so that press cannot be started until push buttons on both sides of press are operated.



Hydraulic Aircraft Press
Wide applications in metal forming.

Controls provide for starting, stopping and semi-automatic operation and inching. Press is provided with adjustable pressure and stroke control.

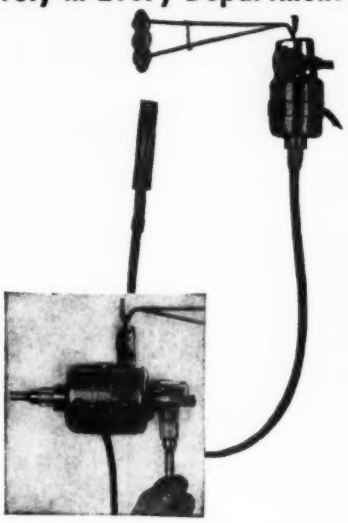
JONES & LAMSON THREAD GRINDER (E51)

A line of new fully automatic internal thread grinding machines is announced by the Jones & Lamson Machine Company, Springfield, Vermont. On all models the grinding wheel spindle is automatically withdrawn from the grinding position to the wheel dressing position, the wheel is dressed automatically, and the grinding wheel spindle is returned to the working position. The amount dressed off the wheel is compensated for automatically, and the ma-

FOREDOM *World's Most Complete Line of Light Flexible Shaft Tools*

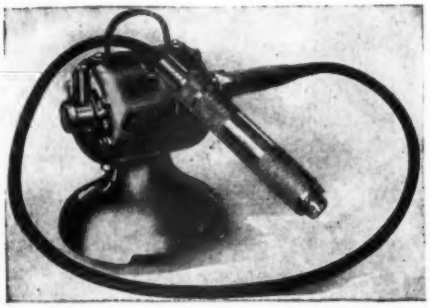
Built-for-Service, Yet Inexpensive——
Perform Numerous Jobs Effectively in Every Department

Thousands of **Foredom Flexible Shaft Tools** are in daily use in shops all over the country. These tools are capable of paying their way on only a few jobs—sometimes on a ***single*** job where an expensive reset is saved through the use of the Foredom. They are inexpensive enough for generous distribution about your plant to do the innumerable jobs they can perform so effectively in every department, whether production, maintenance or tool. Use the Foredom for grinding, milling, polishing, sanding, scratch-brushing, carving, etc., etc., and of course, for finishing, correcting and touching up dies, molds, etc.



MODEL 440

illustrated at right has the "Bi-connective" feature which facilitates quickly attaching flexible shaft to geared end for low speeds and to direct-drive end for high speeds. With the additional aid of a foot rheostat which comes with the tool, an extremely wide range of speeds is provided. Complete, **$43.95.**



MODEL 340

Included in the Foredom line are several styles of suspension models which can be hung on any convenient hook or bracket, as well as easily portable bench models as shown at left. Some come with pencil-size handpieces for fine, sensitive control. Five handpiece types are available, all with the quick-interchange feature. Complete with foot or hand operated rheostat, **$39.50.**

Send for Free Illustrated Catalog

FOREDOM ELECTRIC CO. Quality at Economy Prices SINCE 1922

27 Park Place **Dept. 238** **New York, N. Y.**

chine feeds in automatically on successive cuts until size is reached. When size is reached, the wheel spindle is automatically moved to the dressing position, and the machine stops. Each model is provided with a direct current wheel motor with rheostat control to permit a complete range of grinding wheel speeds.

An air cylinder is used to obtain rapid movement of the grinding wheel spindle

Thread Grinding Machine
The operation is entirely automatic.

from working position to dressing position and vice versa. All units thus far furnished have been air operated, but hydraulic operation is possible.

Ample clearance is permitted for gauging and changing the work. When the machine is in the gauging position, a safety device locks the position of the grinding wheel spindle to prevent accident to the operator while gauging or changing the work, or should the air pressure fail.

VERNON SURFACE GRINDER (E52)

A new combination universal grinder for all types of tool, cutter, and reamer grinding, internal, and external as well as surface grinding, has just been introduced by the Machinery Manufacturing Company, Dept. TE 441, 1915 E. 51st Street, Vernon, Los Angeles, California. This machine has several important new features incorporated in its design, particularly the fact that the motor which carries the grinding wheels swivels through 350° vertically, and the column on which the motor is mounted also swivels through 350° horizontally. The center of the motor and column are thus positioned to align either cylindrical or surface grinding wheels with the center of the bed providing full grinding range without elongation of the ways.

The machine table is traversed by a two speed hand wheel and may be operated from either the front or rear of the machine. By tilting the motor and swiveling the column carbide tools can be ground. Provision is also made for the use of a coolant pump so that the machine can be used as both a wet cylindrical or surface grinder if desired.

SIGNALS

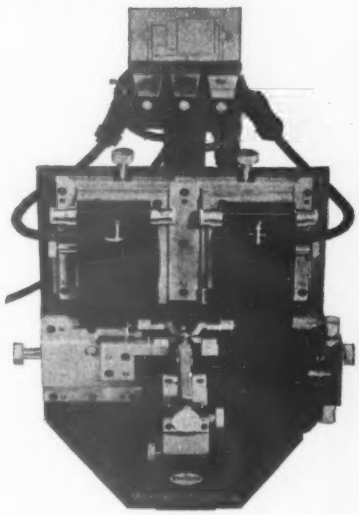
"Everything under control"

The Multichek Electrigage is like a battalion of U. S. troops. They quickly establish order and have everything under control. The Multichek Electrigages check a number of dimensions on a work part simultaneously, flashing the answers on a control panel.

This panel carries an elevation drawing of the work piece with each critical dimension shown. A signal light is provided for each of these dimensions.

A signal light showing red indicates its dimension is undersize, green an oversize dimension and amber that the dimension is truly within tolerance limits. When four or more measurements are being checked a master signal may be provided at the top of the panel to show white when all dimensions are correct. Thus the inspector looks only at the master signal unless it indicates trouble somewhere below.

Other models of this instrument are just as effective on extremely large shell bodies as this model is on small pinions less than a quarter of an inch long. Every part produced in large quantities which has several dimensions to be checked should be inspected on the Multichek Electrigage regardless of bulk.



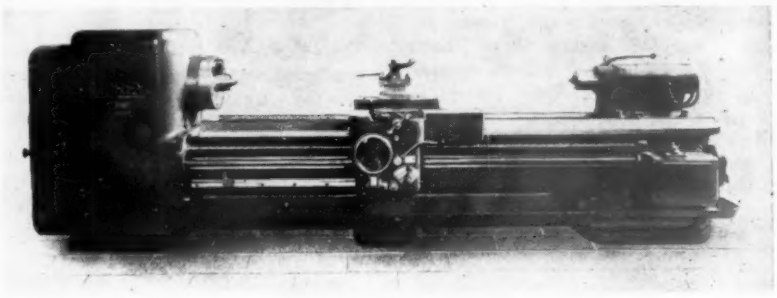
Write for details

THE SHEFFIELD CORPORATION
Gage Division · DAYTON, OHIO, U.S.A.

SHEFFIELD MASTER GAGEMAKERS

MOREY MANUFACTURING LATHE (E53)

A new 27" manufacturing lathe is announced by the Morey Machinery Co., New York City. This lathe is built for single purpose operation — turning at the maximum speeds and feeds that Tungsten Carbide tools and other present-day tool steels will permit. With finger tip control, it is designed for efficient handling by non-skilled labor. Speeds can be set up to suit each individual job with spindle feed variations by pick off gears. The exact feed desired for the job can be selected instantly and all feeds are hydraulic.



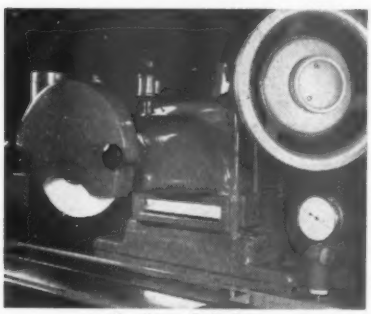
27" Manufacturing Lathe
High speed operation with non-skilled labor.

The lathe is equipped with automatic stops, and power traverse, is built with heavy, rigid construction, and is said to be free from vibration.

DOALL PRECISION GRINDER (E54)

A new DoAll precision surface grinder, said to maintain rigid standards of accuracy is announced by Continental Machines, Inc., 1304 South Washington Avenue, Minneapolis, Minnesota. Super precision ball bearings carried in a ground heat treated forged SAE 3140 quill make up the heart of the spindle head assembly. The lapped spindle hole thru the spindle head assures a perfect fit.

Features include built in flush type lighting, directed to where it is needed. dial indicator giving direct measurement between wheel and work in tenths,

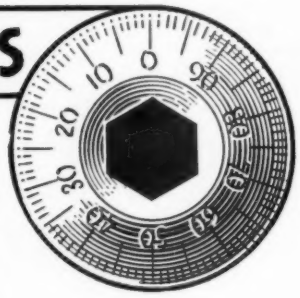


Surface Grinder
Accurate to rigid standards.

an adjustable dust or splash guard which can be set close to the work and adjusted as the wheel wears. The wheel guard rotates and can be locked in any position when using a tangent-to-radius wheel dresser. The handwheel is graduated in half-thousandths and has an auxiliary vernier adjustment for feeding in tenths. The handwheel is finished in dull chrome with enamel filled graduation—assurance against rust from perspiration or coolant. The dull chrome finish makes an ideal surface to mark settings with a lead pencil.

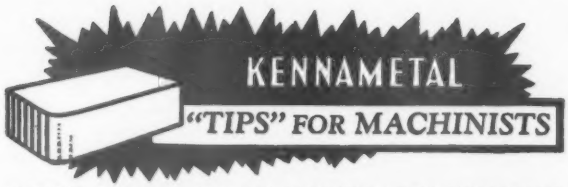
for Boring Jobs that Need COST CUTTING

DAVIS BORING TOOLS



This trademark symbolizes the proven Speed, Accuracy, and Interchangeability of DAVIS Boring Tools. Surprising economies have been effected in hundreds of shops, boring all kinds of work. Send us prints of *your* special work, for a specific, *money-saving* recommendation.

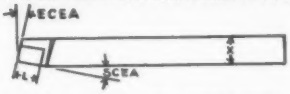
DAVIS BORING TOOL DIVISION
Larkin Packer Co., Inc., St. Louis, U. S. A.



HOW TO GET QUICKER DELIVERIES ON NON-STANDARD KENNAMETAL TOOLS

If a standard KENNAMETAL - tipped carbide steel cutting tool does not exactly fit your needs, you can often save money, and get quicker deliveries, by ordering a "Modified" Standard KENNAMETAL tool. Modifications may be made either in tool angles or in shank dimensions, ***with no increase in cost.*** One such modification is illustrated herewith.

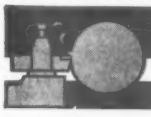
These Tools Are the Same Price



Standard Style 11T80 KENNAMETAL tool with 15° SCEA, 15° ECEA, and 7" long shank.

Modified Style 11T80 KENNAMETAL tool with 30° SCEA, 38° ECEA, and 5½" long shank.

Send today for our new Catalog No. 41 listing standard styles and prices for KENNAMETAL tools. Also ask for leaflet showing how to order Modified tools.



McKENNA METALS Co.
600 LLOYD AVENUE
LATROBE, PENNSYLVANIA, U.S.A.

MORE SPEED LONGER LIFE
with PUTNAM END MILLS

In an operation such as that illustrated —milling ⅜" slots in a die block— Putnam End Mills permit the maximum speed and feed. In addition, manufacturing and heat treating methods assure long, trouble-free service. Why not prove to your own satisfaction—by actual use on your machines—that the end mills which do "cut faster and last longer" are produced by Putnam?

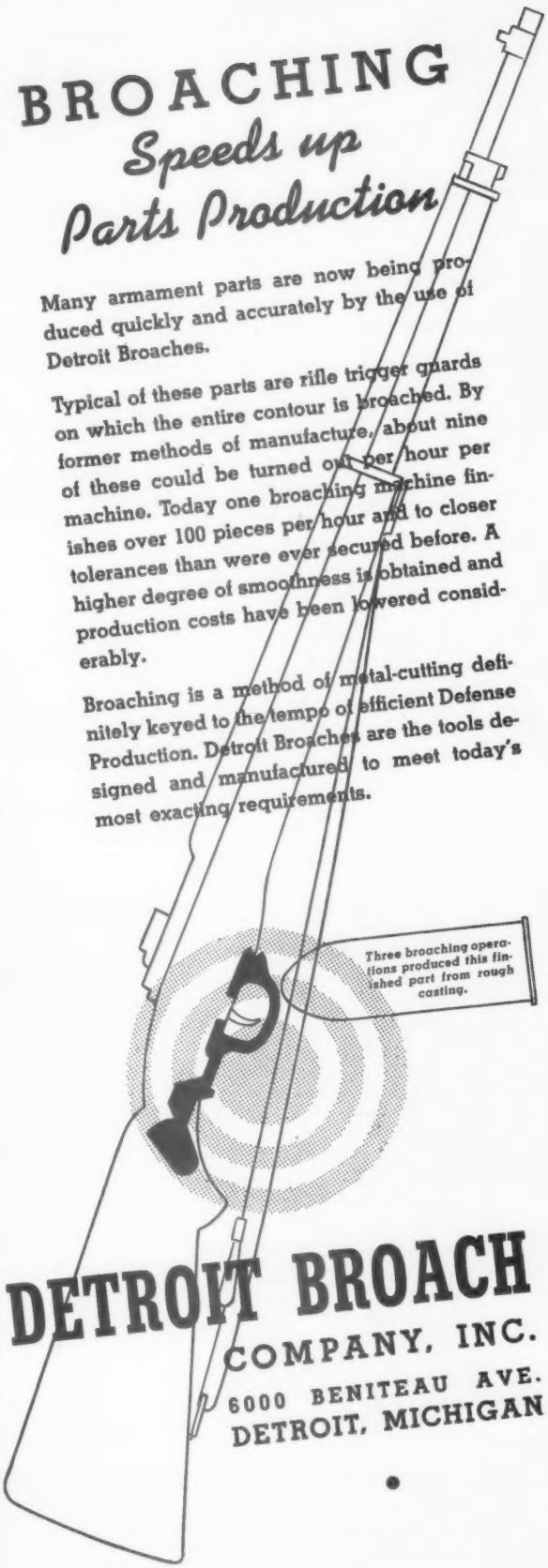
PUTNAM TOOL COMPANY
2987 Charlevoix Ave. • Detroit, Michigan

BROACHING
Speeds up Parts Production

Many armament parts are now being produced quickly and accurately by the use of Detroit Broaches.

Typical of these parts are rifle trigger guards on which the entire contour is broached. By former methods of manufacture, about nine of these could be turned out per hour per machine. Today one broaching machine finishes over 100 pieces per hour and to closer tolerances than were ever secured before. A higher degree of smoothness is obtained and production costs have been lowered considerably.

Broaching is a method of metal-cutting definitely keyed to the tempo of efficient Defense Production. Detroit Broaches are the tools designed and manufactured to meet today's most exacting requirements.



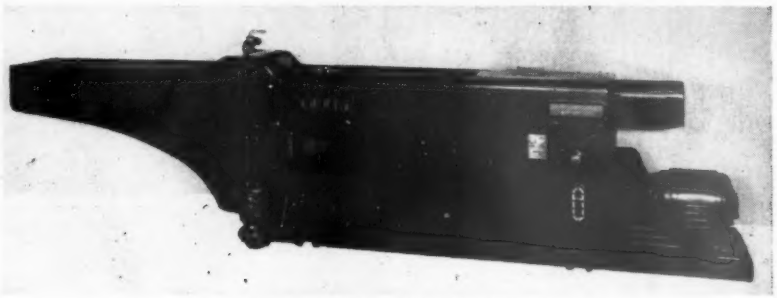
Three broaching operations produced this finished part from rough casting.

DETROIT BROACH
COMPANY, INC.
6000 BENITEAU AVE.
DETROIT, MICHIGAN

COLONIAL HORIZONTAL BROACH (E55)

A complete new standard line of universal horizontal broaching machines is now being introduced by Colonial Broach Co., Detroit. The standard machines range in capacity from 3 tons and 36 inch stroke to 25 tons and 90 inch stroke, with larger capacities available on special order.

In these new broaching machines the peak capacities have been substantially increased over the normal ratings. The new peak capacities provide greater reserve power and smoother operation when tooling is adapted for the normal capacities of the machines.



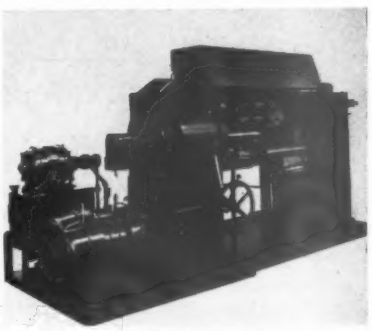
Horizontal Broaching Machine
Greater reserve power provides smoother operation.

Two important new features include a shock-proof control mechanism to prevent impact of the starting lever at each end of the stroke and a readily accessible and increased vertical adjustment for the drive head to provide greater flexibility for off-center special broaching set-ups. Provision for convenient mounting of spiral broach drive heads has been maintained, adapting the machine to spiral broaching set-ups.

Cylinders are of steel tube construction with welded joints to insure against leaks and to provide longer life. Valves and piping have been simplified to facilitate accessibility for service and maintenance. An integral motor and pump bracket assures correct alignment between these units, which is said to prevent wear and give longer life with quiet operation.

FEDERAL SHELL LATHE (E56)

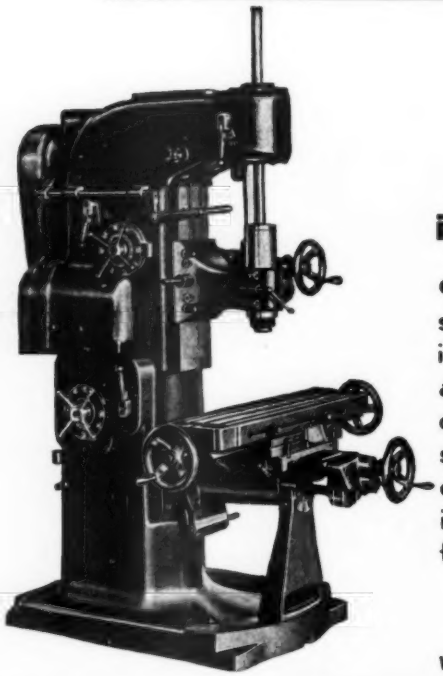
A special shell turning lathe of unique design is being offered to the munition manufacturers in this country by The Federal Machine and Welder Company of Warren, Ohio. This shell turning lathe is not a conventional machine tool but is a special lathe, designed to meet high production requirements in times of emergency.



Shell Turning Lathe
Developed in England.

The design was completely engineered by the Britannia Machine Tool

Doing its Work for
NATIONAL DEFENSE
★ *Quickly . . .*
★ *Accurately . . .*
★ *Economically .*



★

KNIGHT-TIME
is the quickest time

• One of the many time-saving Knight Miller features is the ability to get all vertical adjustments by moving the counterbalanced spindle or spindle-head. This feature eliminates raising and lowering a large, heavy table unit for vertical capacity.

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• ST. LOUIS, MISSOURI •

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Keep production high with BRADY - PENROD Coolant and Circulatory Pumps - motor driven, open impeller, centrifugal type. If you get poor results from standard pumps, let us produce the special type you need for volume business. Our pumps have hydraulic efficiency as high as 70%. They are designed to eliminate wear on the pump; reliable for use with abrasives. Equal efficiency maintained, pumping water or light oil. All five models available with separate rating established at 400 SSU; 750 SSU; 1250 SSU; 2000 SSU.

⅛H.P. MOTOR REPLACES ¼H.P. - through superior pump design. All motors have 20% surplus power.

CAPACITIES: ½"to 2"pipe; 4 to 100 gallons per minute. Special models for larger capacities. Pressure up to 100 feet head.

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HAVE ADJUSTMENT TO TAKE UP WEAR AND PRELOAD BEARINGS

STANDARD MORSE TAPER No. 2 TO 6 IN STOCK

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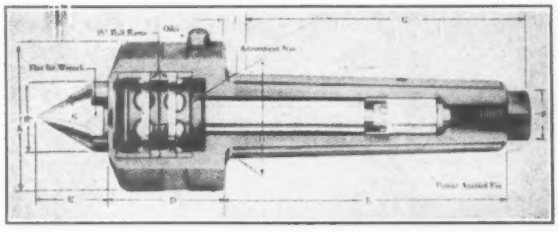

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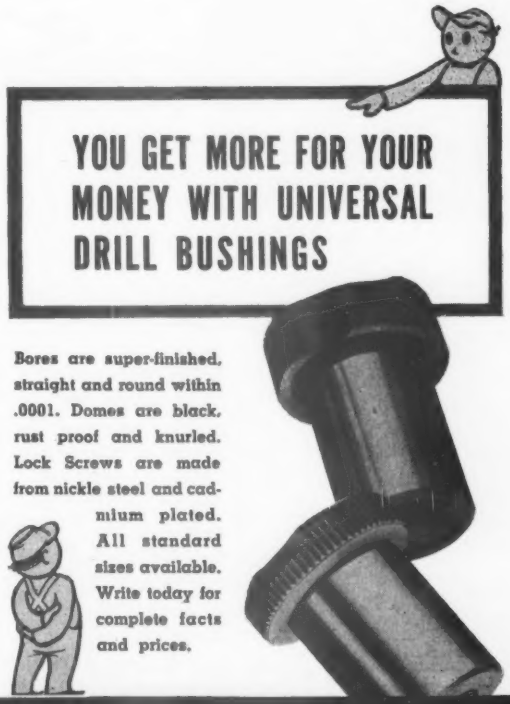


YOU GET MORE FOR YOUR MONEY WITH UNIVERSAL DRILL BUSHINGS

Bores are super-finished, straight and round within .0001. Domes are black, rust proof and knurled. Lock Screws are made from nickle steel and cadmium plated. All standard sizes available. Write today for complete facts and prices.

UNIVERSAL ENGINEERING CO.
FRANKENMUTH, MICHIGAN

Company, Limited of London, England, prior to the beginning of the war in order to have a machine available which would meet the conditions with which that country is now faced—that of turning out shells in large quantities with unskilled help.

In order to do their share in the present National Defense Program, The Federal Machine and Welder Company made arrangements with the Britannia Machine Tool Company Limited to take over the design of this lathe and manufacture it in this country.

Many new features are embodied in the design of this lathe such as the tool boxes being supported from a bridge overhead to permit the chips to fall clear; a conveyor for loading and unloading the shells without being lifted by the operator and many other features which are described in Bulletin No. 911. (A copy of this bulletin will be sent by the manufacturers upon request.)

It has been noted that the production on this machine for large shells is extremely high, as from eighteen to twenty British 5½" shells, 27" long, can be rough-turned per hour without fatigue by unskilled operators.

SIBLEY DRILL PRESS (E57)

A new 25" swing all-geared drilling machine is announced by the Sibley Machine and Foundry Corporation, South Bend, Indiana. It has been engineered and designed throughout for efficient operation in both the tool room and for production work. Precision accuracy and a rugged design are said to have been built into this new drill press, permitting it to handle fine tool room and production work, as well as heavy, tough drilling jobs.

Instant change of feeds and speeds are effected by levers within easy reach of the operator. Both levers are cam operated. Spindle speeds range from 75 to 1500 RPM. Feeds range from .005" to .045". The six splined spindle can be operated either by power or hand feed; the travel by power is 12" and by hand 12½". It takes No. 4 and No. 5 Morse Taper.

Drilling Machine
For tool room and production work.

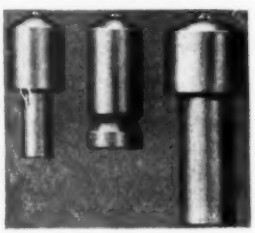
The all-geared drive is obtained through a series of alloy steel, heat-treated gears mounted on horizontal shafts. The transmission is totally enclosed, but is a complete removable unit with the transmission shafts mounted on anti-friction bearings. Multi-splined shafts are used throughout. All gears operate in a bath of oil. This provides a smooth, powerful drive.

PRODUCE MORE WORK PER MACHINE!

Use DIAMOND TOOLS

Above: Shaped Diamond Cutting Tools for turning, boring, facing.

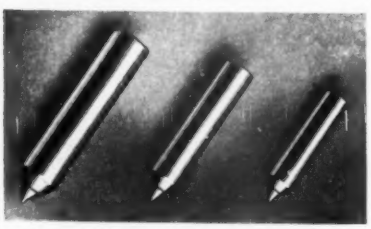
Right: Landis Nib, Norton Nib, Cincinnati Nib for truing and shaping emery wheels.



Higher Speed—Greater Precision Better Finish — More Capacity!

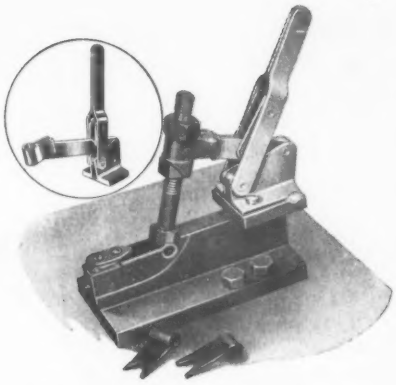
Is your production handicapped by insufficient machines? Shortage of Tool Steel? Time lost changing cutting tools? Switch to Diamond Tools and produce more with present machines! Diamonds — the hardest substance known—cut cleaner, faster, more accurately on the toughest metals, alloys, compositions and abrasive materials. They stand up much longer than the finest tool steel. They often eliminate polishing. Discover for yourself the superior qualities of Diamond Tools for cutting, drilling, facing, abrasive wheel truing, sawing, polishing, etc. Write for detailed, illustrated folder — or send blueprints for quotation on special shaped tools.

For over 30 years, Anton Smit & Co. have specialized in Industrial Diamonds and Diamond Tools, maintaining extensive stocks of Bortz, Carbons, Ballas, Cleaved or Natural Points, Diamonds for Dies, Glazier Diamonds, Phono-Points, Crushing Boart, Splint, Powder, etc., in all sizes and qualities.



"Conepoint" Diamonds for truing grinding wheels.

ANTON SMIT & CO., Inc.
24 STATE STREET • NEW YORK, N. Y.



Pressed metal part held in fixture for milling operation.

What Do You Require of Toggle Clamps?

To hold parts in fixtures . . . in exact position . . . during every phase of manufacture or assembly . . . for one second or one hour . . . To clamp positively . . . To release instantly . . . To reach maximum production . . . To stand up under extreme service . . . These are the functions that De-Sta-Co Toggle Clamps ably perform.

Bulletin No. 40, showing sizes and giving detailed specifications, will be sent you on request.

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356 Midland Ave • Detroit, Mich.

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CARBON TOOL STEELS—
SPECIAL, EXTRA and STANDARD grades will meet many of today's tooling needs—stocks are good and deliveries, although somewhat delayed, are otherwise unrestricted.

It pays to use Good Tool Steel.

COLUMBIA TOOL STEEL COMPANY
ARTHUR T. CLARAGE, PRESIDENT
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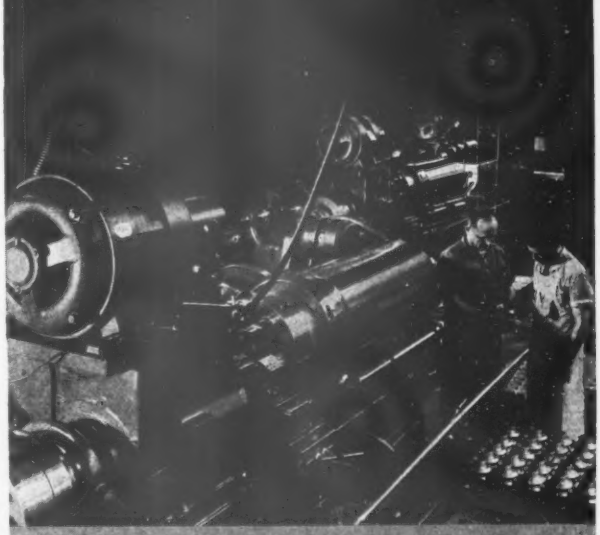
500 EAST 14TH STREET • CHICAGO HEIGHTS, ILL.

MODEL A SPEEDS UP THE PRODUCTION OF PARTS AT CLEVELAND PNEUMATIC TOOL



• Nearly 30 Cleveland Automatics are clipping time off parts production in the big plants of The Cleveland Pneumatic Tool Company, which for almost 40 years has required their accuracy, speed and dependability in its production of parts for pneumatic tools and airplane landing gear shock absorbers. Shown here are two new 5¾-inch and one 3¾-inch capacity Model A Single Spindle Cleveland Automatics recently installed, already establishing new records for reliable, highly accurate production. In a modern plant with modern conditions and modern materials, Cleveland Automatics fit themselves into the production cycle smoothly and efficiently, amortizing their cost rapidly and dependably, as they are designed to do. Write us for bulletins describing Model A specifications.

THE CLEVELAND AUTOMATIC MACHINE COMPANY
2369 ASHLAND ROAD, CLEVELAND, OHIO

Sales Offices at:
Newark, 18 Washington Street • *Detroit*, 2842 Grand Boulevard
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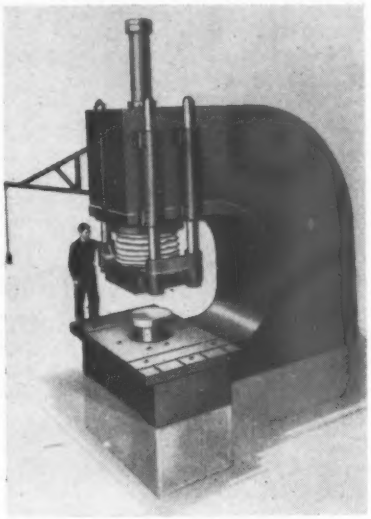
CLEVELAND *Single Spindle* AUTOMATICS

DENISON HYDRAULIC PRESS (E58)

A 400 ton C-Frame hydraulic press that combines the main ram, rapid traverse cylinder, and a stripper cylinder operating through the bolster, has recently been completed by the Denison Engineering Company, Columbus, Ohio. The oil reservoir, the hydraulic pump and motor, the motor starter, electrical controls and the control valves are all assembled within the open or C-type frame. The frame is constructed entirely of welded steel plate thoroughly annealed and normalized after welding. To obtain the proper working height for the bolster, the press, when installed, extends below the floor level.

The main press cylinder has a capacity of 400 tons, a 30 inch stroke. It is single acting, and has a 36" x 36" platen provided with T slots for affixing tools. Two guide rams, operating in bronze-lined bearings, are attached on each side of the press to prevent the main ram from rotating.

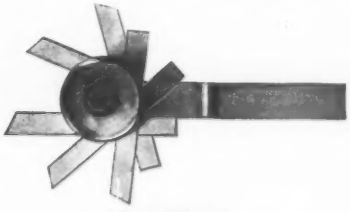
The rapid traverse, or pull-back, cylinder is double-acting, and is flange mounted on the main press cylinder. It has the same stroke and working pressure as the main cylinder. It has a down-speed of 6 feet per minute and up-speed of 10 feet per minute. All cylinder and ram operations and their controls are coordinated and provided with safety arrangements to give full protection at all time against damage, either to the press or to the work.



Hydraulic Press
Made of welded steel plate.

FLEXOID TOOL HOLDER (E59)

The Flexoid Tool Holder is a new product manufactured by the Smith Power Transmission Company, Cleveland, Ohio. It is intended for use on all types of lathes and other machine tools. The bit can be quickly adjusted to every possible cutting position without being removed from the holder, eliminating the need of right, straight, or left hand shanks. This is accomplished by means of a rotating universal head with an off center opening through which the bit is placed. A single socket head cap screw rigidly locks simultaneously both the head and bit in the correct cutting position, allowing no vibration when in operation. No change in centers is necessary when resetting cutter.



Tool Holder
Bit is quickly adjusted.

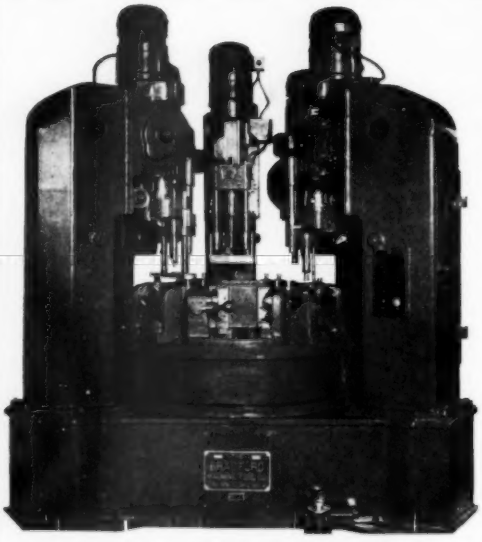
Flexoid tool holders are built of hard alloy steel, in five sizes—No. 0 to No. 4.

TO MEET TODAY'S CRY FOR INCREASED PRODUCTION

You must have machines that will perform many operations at once, or in quick succession

BRADFORD DRILLING AND TAPPING UNITS

Make increased production possible



A Bradford 5-Unit Machine for drilling, spotfacing, reaming, and tapping automobile transmission cases, performing 1440 operations per hour.

Can't you imagine the increased production and lowered per piece cost that would result from operating a machine that performs drilling, reaming, tapping, hollowmilling, spotfacing simultaneously or in sequence?

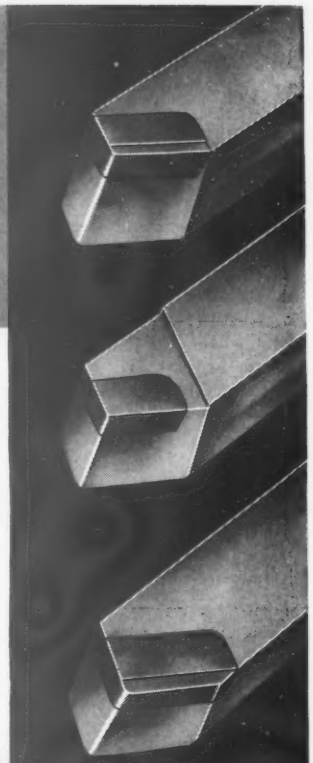
Put your problem up to our engineers! Simply send us the blue prints of the parts on which you want faster production — we'll design the equipment that will bring economies and maximum efficiency in your production.

We also manufacture the Bradford Geared Head Engine Lathe

THE BRADFORD MACHINE TOOL CO.
CINCINNATI, OHIO
PRECISION TOOLS SINCE 1840

Reduce Fabricating Costs

all down the line with TECO Carbide Cutting TOOLS



PRODUCTION goes up . . . costs come down . . . when TECO Carbide TOOLS "take over". This higher-speed cutting tool reduces floor-to-floor time 30% to 50%, delivers 10 to 50 times as many pieces per tool, cuts fabricating costs all down the line! For amazingly longer tool life, plus low original cost, put TECO Carbide Cutting TOOLS on your machining job. Let a Tungsten Electric engineer demonstrate more continuous production and greater long-run economy in your plant.

There is a standard grade of TECO METAL to meet the characteristics of almost any machinable material. Ask for a shop demonstration without obligation. For information concerning special applications and specific recommendations, address

Tungsten Electric supplies carbide blanks, tools and bits. Wire and bar dies, tubing, extruding and sizing dies. Also special tools, such as spot facers, reamers, combinations, broaches, form tools, etc.

PROMPT, EFFICIENT, SPEEDY
TUNGSTEN ELECTRIC SERVICE
means more to you now than ever before.
CONSULT US

TUNGSTEN ELECTRIC CORPORATION • 570-39th STREET, UNION CITY, N. J.
Branch Office: 2900 EUCLID AVE., CLEVELAND, OHIO
Pioneers in Tungsten Carbides for Over a Quarter of a Century

TECO CARBIDE TOOLS *pay dividends!*

The Model A600 Tool and Cutter Grinder

K. O. Lee Company

Aberdeen, South Dakota TCG41-6TE

ARMSTRONG

DROP FORGED "C" CLAMPS

Because they never give, these ARMSTRONG Heavy Duty "C" Clamps are safely used, day after day, to carry these gigantic steel automobile body dies where the slightest spread or spring or the least slippage of the screw would result in disaster.

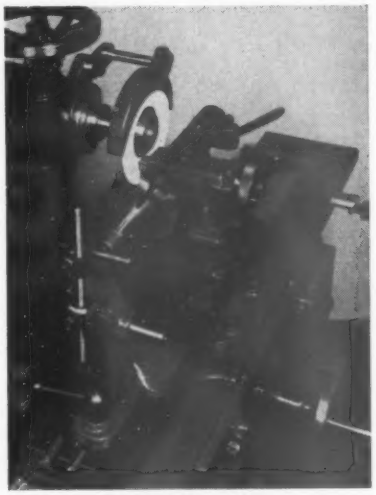
Here is dependable quality that you too can rely on. Look for the Arm-and-Hammer Trade Mark. It guarantees a better clamp. *Write for Catalog C-39*

ARMSTRONG BROS. TOOL CO.
"THE TOOL HOLDER PEOPLE"
360 N. FRANCISCO AVE. CHICAGO, U. S. A.
Eastern Warehouse and Sales: 199 Lafayette St., New York

BROWN & SHARPE (E60) CUTTER SHARPENER

A through feed type form cutter sharpening attachment is offered by Brown and Sharpe Manufacturing Company, Providence, Rhode Island, for use on their tool grinding machine. This attachment gives a straight cut across the entire tooth face, and provides for the efficient and accurate sharpening of formed cutters up to 6" in diameter with straight teeth. A dish wheel is used, with the wheel spindle at right angles to the table; and the cutter is supported on a horizontal arbor between the centers of the machine, and is passed across the face of the wheel by traversing the table.

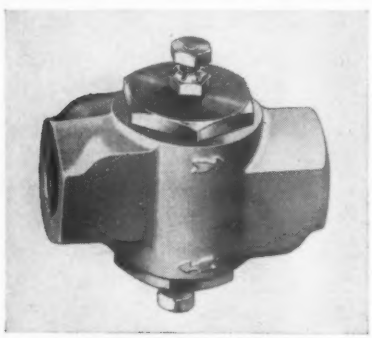
The attachment consists of a rigid, adjustable tooth rest assembly mounted at the top of a sturdy column which is adjustable vertically to accommodate cutters up to 6" in diameter. A rack and pinion provide easy, positive adjustment, and the rack serves as a key to maintain angular alignment. The supporting bracket which carries the column is adjustable transversely along dovetail ways in a solid base; and the base, in turn, is tongued for accurate alignment, and is bolted to the machined table.



Cutter Sharpening
By means of a dish wheel.

HANNA (E61) SPEED CONTROL VALVE

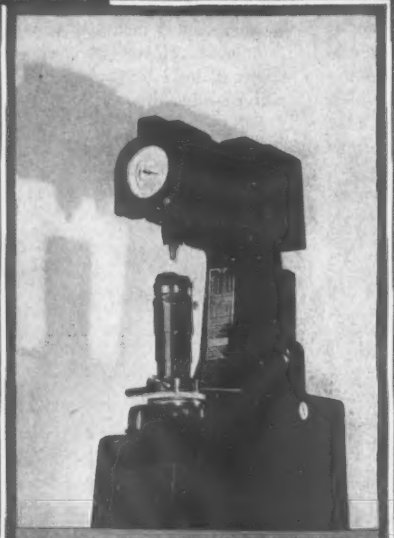
A new two direction speed control valve has been designed and built by Hanna Engineering Works, 1765 Elston Avenue, Chicago. This valve controls the speed of piston travel. Installed between operating valve and one end of a cylinder, one valve provides adjustable control of inflow as well as exhaust of the air independently to and from one side of the piston. One valve will therefore control the piston speed in two directions. For extra sensitive adjustment and control of piston speed two control valves, one for each end of the cylinder, are recommended.



Speed Control Valve
One valve controls both directions.

This valve is so constructed that the two adjusted orifices which control the airflow in the two directions are set before flow takes place. This insures control from the very start of movement. The valve body is cadmium plated and all other valve parts are made of corrosion resistant material.

ROCKWELL
Motorized
HARDNESS TESTER

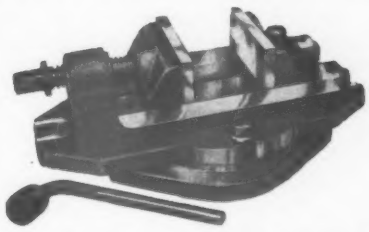


Some Special Requirements call for a Motorized Model

WILSON
MECHANICAL INSTRUMENT CO. INC.
Concord Avenue, N. Y. City

Defense Work Needs Good Tools

PRODUCTO Plain & Swivel Vises
PRODUCTO Camlock Production Vises



★ Producto Screw Acting Plain and Swivel Vises made in two standard sizes—4½" and 6" width of jaws.

Vises are fitted with hardened and ground ways insuring long life. Rear jaws movable to provide extra large opening capacity. Strongest and largest capacity Vises on the market.

Producto Cam Lock Vise for production milling. Double lever Vises permit quick opening and positive locking or clamping—3 sizes—4", 5" and 7" wide.

Circular with complete information available.

Prompt shipments on all sizes of Vises.

Manufacturers of Producto Die Sets and Die Makers' Accessories

THE PRODUCTO MACHINE COMPANY
BRIDGEPORT - - - - CONN.
ALSO DISTRIBUTORS DICKERMAN HITCH FEEDS

New Convenient Drill Grinding Combination

•

Sellers No. 1G Drill Grinder with steel cabinet pedestal

A firm, substantial pedestal for the grinder and the work, and a handy cabinet in which to store supplies and attachments. Cabinet and grinder may be purchased separately, if desired.

The Sellers Model 1G Drill Grinder will grind drills from No. 70 (.028") to ½" and produces accurate drill points of 100 to 65 degrees included angle — perfect drill points with equal identical lips. Speeds production. Saves skilled labor for production machine work. Saves drills. Write for catalog and prices.

WILLIAM SELLERS & CO., INCORPORATED
1626 Hamilton St., Philadelphia, Pa.

SELLERS 1848

Sellers

STOCK STAMPS
for Industrial or defense Marking

Added facilities enable us to maintain our usual prompt delivery service on steel stamps and marking dies. Other quality marking products, properly engineered for your marking need. Write today.

*Reg. U.S. Pat. Off.

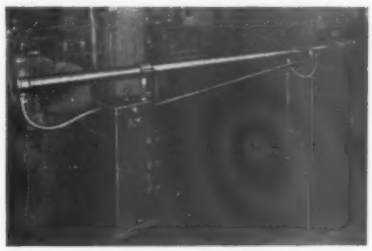
JAS. H. MATTHEWS & CO.
3945 FORBES ST. ∴ PITTSBURGH, PA.
New York—Chicago—Phila.—Boston—Detroit—Newark—Syracuse
DISTRICT SALES OFFICES - CLEVELAND - HARTFORD - BIRMINGHAM

LIPE (E62) BAR FEED

The Lipe Pneumatic Bar Feed unit, a self-contained automatic power stock feed device to be used in connection with machine tools having fixed stops for determining length of work, is manufactured by the W. C. Lipe, Inc., Syracuse, New York. It eliminates feed fingers, collars, chucks, ratchets, rollers, wobble-plates and all troublesome feed parts of screw machines, turret lathes, cutoff machines, etc. It feeds without surface contact and will not scratch or mar any material.

It will feed any distance and hold the stock firmly against stop until the collet is closed. Without setup change it will handle all sizes and shapes within the capacity of the machine tool with which it is used. It consists of an air cylinder sufficiently long to contain a full length stock bar, open at the forward end, adjustably mounted on two fabricated steel standards. Within the cylinder is a piston having a ball bearing cup center which supports the free end of the stock. Air is supplied to the cylinder at very low pressure, and forces the piston forward against the end of the stock, thus causing piston and stock to move forward instantly when the collet is opened. Movement is very rapid and stock is held firmly against stop until collet is closed.

When the piston reaches the forward end of the cylinder the air pressure is automatically shut off and forward motion of the stock ceases. When the unit



Pneumatic Bar Feed
Does not mar material.

is reloaded, the new stock pushes the remaining short length until it is completely used. A coupler tube which floats in the spindle bore of the machine tool, supports the forward end of the new stock in alignment with the short piece and guides it into the collet of the machine.

HAMMOND (E63) CARBIDE TOOL GRINDER

A new Carbide Tool Grinder using 6 inch silicon carbide or diamond wheels has just been placed on the market by Hammond Machinery Builders, Inc., 1636 Douglas Avenue, Kalamazoo, Michigan. The new machine, first in a series of three soon to be completed,

Carbide Tool Grinder
Either wet or dry grinding.

stresses heavier, machine-tool construction for additional strength and solidarity demanded by present production schedules. New features include extra heavy tilting tables which are easily re-

They also Serve
WHO CONSERVE

TUNGSTEN has become a strategically important material, in view of the huge demands of industrial and defense needs, which require High Speed and other tungsten steels in day-by-day increasing quantities.

In the case of High Speed Steels, although 18% tungsten alloys have been standard for years, it is now felt desirable to conserve national supplies by employing *lower* tungsten-content steels wherever practicable. With DBL High Speed Steel, a change-over can be effected without disadvantages, and with actual benefits.

DBL, a development of Allegheny Ludlum research, is a 5½% Tungsten High Speed Steel, thus containing less than one-third as much tungsten as "18-4-1." In addition:

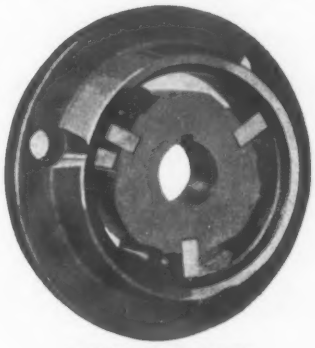
1. DBL equals or betters "18-4-1" in performance.
2. It heat-treats and handles in the same equipment and by the same methods as "18-4-1."
3. It requires no coating to control decarburization.
4. It costs less and is lighter than "18-4-1;" the user secures more pounds of DBL per dollar, and more tools per pound.

● Under normal circumstances, being ourselves large producers of "18-4-1," we would have introduced DBL more gradually. *But these are not normal times.* To steel and tool manufacturers, therefore, we offer a royalty-free license to use DBL. To all users, complete technical data is available upon request for the "DBL Blue Sheet." Write Dept. T-140.

ALLEGHENY LUDLUM
STEEL CORPORATION PITTSBURGH, PA.
Tool Steel Division *Watervliet, N.Y.*

A FIXTURE LOCK TO SUIT YOUR REQUIREMENT

LEFT HAND LOCK
COUNTER CLOCKWISE



RIGHT HAND LOCK
CLOCKWISE

LOCK FOR
BOTH DIRECTIONS

SWARTZ TOOL PRODUCTS CO., INC.

13330 Foley — ASK FOR CATALOG 238 — Detroit, Michigan

Represented by

Cleveland—J. W. Mull, Jr.
Indianapolis—J. W. Mull, Jr.
Milwaukee—Geo. M. Wolff, Inc.
Chicago—Erale Johnson

Canada—Hi-Speed Tools, Ltd., Galt, Ont.
St. Louis—Mill Supply & Mach. Co.
Beverly Hills, Cal.—Criterion Tool Sales
Houston—Engineering Sales Co.

Oneida, N. Y.—W. F. Himmelsbach
Pittsburgh—J. W. Mull, Jr.
Toledo—J. W. Mull, Jr.
Philadelphia, Pa.—Morgan Tool & Equipment Co.

NEW TWO-PIECE NUT REDUCES LOCKING EFFORT BY 50%

(Right) Cross section of new Universal collet chuck showing floating collar that makes locking easy. Available in the 3 larger sizes — Z, ZZ, and XZ. ➤

◀ Universal standard collet chucks have ground threads, ample room for tool feed out and are ideal for holding end mills, keyway cutters, drills, etc. Nut fluted for Spanner wrench.

UNIVERSAL ENGINEERING CO.

FRANKENMUTH, MICHIGAN

Want ACCURACY? --- Use J. K. SMIT & SONS PRECISION Diamond Tools

The illustration shows the effective design of the STA-KOOL Diamond Tool Holder.

STA-KOOL—Dissipates Heat
Prolongs Life
Reduces Cost

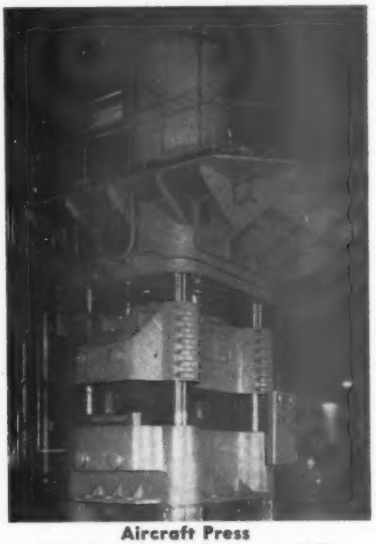
Write for further information about STA-KOOL— "Tool Engineered" for precision.

J. K. SMIT & SONS, INC.
157 Chambers Street, New York, N. Y.
7 South Main St., West Hartford, Conn. — Law and Finance Bldg., Pittsburgh, Pa.
Detroit — Chicago — Seattle

movable without the use of tools. To install new wheels, a single clamp releases the table which may be quickly slid off the 1¾" supporting shaft. Tables are slotted for the protractor angle-guide furnished with the machine. Inside edge of each table is machined inward at an angle to permit tilting without necessitating readjustment of the distance between table and wheel. The cast-iron support under each table serves also as a sludge pan and is easily removed and cleaned by releasing the same clamp that locks the tilting table to the supporting shaft. For accuracy in grinding angles, a plainly marked indicator, ranging from 0 to 25 degrees is mounted directly beneath each table. For wet grinding, an integral wheel guard and coolant tank, as illustrated, may be substituted easily for the standard cast-iron wheel guard.

HYDRAULIC AIRCRAFT PRESS (E64)

The largest self-contained hydraulic press ever built is now being put into service in England for forming fuselage parts for bombers. It was built by the Hydraulic Press Mfg. Company, Mount Gilead, Ohio. This 5000 ton Fastraverse press was an exact duplicate of a press furnished Douglas Aircraft Company in 1937. A large rubber pad 168" x 50" is recessed into the bottom of the press platen. This pad takes the place of upper dies. Inexpensive lower dies, mounted on the press bolster plate, are made from masonite and reinforced with steel at their cutting edges. This method of cutting and forming metal aircraft parts is known as the "Guerin Process."



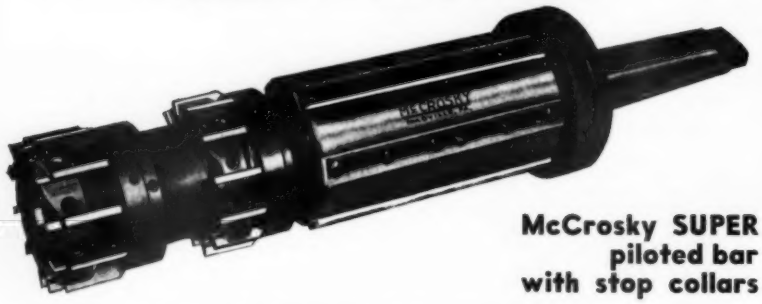
Aircraft Press
Largest self-contained ever built

The press is equipped with a closed circuit operating system. Press reversal is accomplished by reversing the discharge of the radial type pressure generator. No operating valves are employed in this system. Smooth, shockless press operation is said to be the result.

ROCKFORD LMC CLUTCH (E65)

A new Rockford LMC Clutch is manufactured by the Rockford Drilling Machine Division, Borg-Warner Corporation, Rockford, Illinois. This clutch transmits 1 H.P. at 100 R.P.M.; proportionately smaller or larger H.P., as speeds decrease or increase, up to maximum of 6 H.P. It has a strong symmetrical body which is accurately machined; operating links, pins, and rollers are all hardened steel. Toggle action goes overcenter, locks clutch in driving position, provides easy engagement, powerful pull, according to the manufacturer. No oiling is necessary for accurate metal bushing which carries driven sprocket, pulley, sheave, flange, or other part of machine in which clutch is installed. Steel end-plate is threaded for fine adjustment; has fibre protecting plug, slotted locking screw.

BOOST AND SAFEGUARD HOLE PRODUCTION



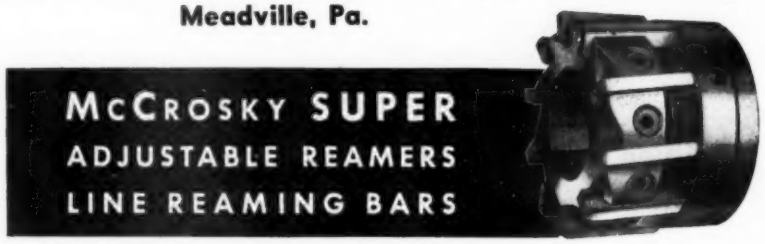
McCrosky SUPER piloted bar with stop collars

McCrosky SUPER Line-Reaming Bars

ASK FOR McCROSKY COST CUTTING TOOLS **BULLETIN No. 15-A**

YOUR need for concentric holes accurately reamed in line can be filled by a McCrosky piloted bar engineered to the job and fitted with standard McCrosky SUPER Reamers. Standard SUPER Shell Reamers have large straight holes permitting the use of sturdy, rigid bars. They are compact in design to permit mounting several sizes on one bar even when the distance from work to spindle is limited . . . Ask McCrosky engineers to submit a layout of the SUPER bar engineered to your line-reaming job.

McCROSKY TOOL CORPORATION
Meadville, Pa.



TIME SAVING COST-CUTTING TOOLS

APEX Safety Friction Chucks are safe and simple to operate . . . reliable . . . prevent tool breakage. Multiple discs, steel and fibre, have large friction area for long life. Tension is maintained for thousands of operations without adjustment. Same setting used for drilling and tapping. Tool can be used in any position.

Positive Drive Chucks for multiple spindle drilling using Morse Taper and straight shank tools save time in changing and sharpening tools; no danger of disturbing spindle alignment. Particularly adaptable for use on electric and air tools where quick change of tools is desired.

Vertical Float Drilling and Tapping Chucks with collets and accessory tools for drilling, tapping, stud and nut setting.

Universal Joints, strong and smooth running . . . Universal Joint Socket Wrenches for all types of electric and air nut runners . . . Floating Tool Holders—parallel float only, and also universal with both parallel and angular float.

Write for Catalog No. 14

The APEX MACHINE & TOOL CO.

1027 S. Patterson Boulevard **DAYTON, OHIO**

VINCO Angle Tangent To Radius DRESSER

. . . The Only Abrasive Wheel Dresser Offering All These Advantages

★ Provides the **only** fast, accurate method of meeting every forming requirement in dressing operations.

★ Incorporates the basic patented principle of dressing radii, angles and angles tangent to radii on abrasive wheels from the same axis without moving the diamond.

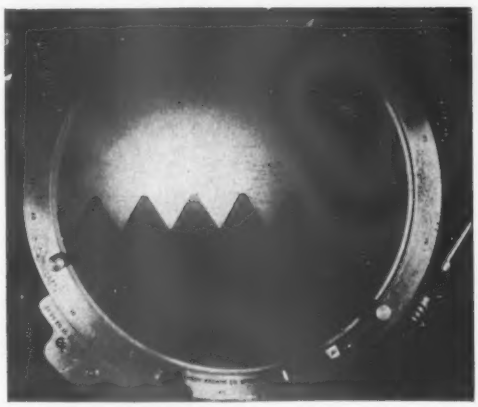
★ Can be used on your surface, external, cutter and internal grinders.

★ You can count on dressing accuracy to within .0001" and savings of approximately 75% in dressing costs.

WRITE FOR FULL INFORMATION

VINCO Corporation

9115 SCHAEFER HIGHWAY DETROIT, MICHIGAN



SCREW THREAD

Ground by

ACME INDUSTRIAL COMPANY

Makers of Standardized Jig and Fixture Bushings

208 N. Laflin St. Chicago, Ill.

MONroe 4122

BRADY PENROD HYDRAULIC PUMP (E66)

Increased hydraulic efficiency of coolant and circulatory pumps is claimed by the Brady-Penrod, Inc., Muncie, Indiana. These pumps are said by actual test to have efficiency as high as 70% while some similar pumps on the market deliver as low as 16% in actual use. Francis E. Brady, Jr., designer of the new models, states that this high efficiency is accomplished by elevating hydraulic shock as the liquid travels through the pump. The design uses a venturi impeller inlet, constant velocity vane curvature, progressive volute and orifice conversion discharge throat. Many items of the new pump are patented.

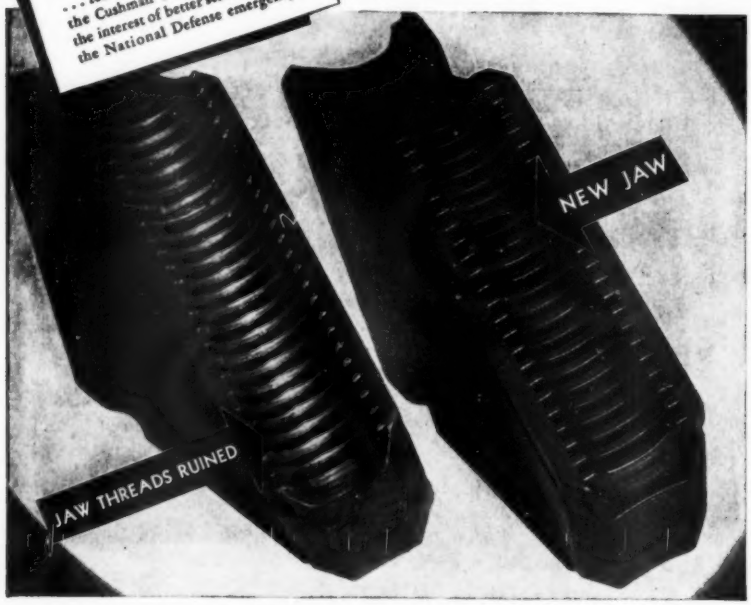
Model 100 - Self-Priming Vertical Mounting

Designed to eliminate wear on the pump, they are said to move as much liquid with a ⅛ H.P. motor as formerly accomplished by a ¼ H.P. motor. Equal efficiency is maintained whether pumping water or light oil. Two of the models are self-priming — a patented feature. This feature permits pumps to be installed above the water line in any convenient location.

Timely SUGGESTIONS

. . . for chuck users. Published by the Cushman Chuck Company in the interest of better service during the National Defense emergency.

Step up MAINTENANCE . . when you step up production



Very little in the way of maintenance is required by modern Cushman PRECISION Chucks . . . but that little is highly important. The entire operating mechanism of a Cushman Chuck, for example, is enclosed within the chuck body and lubricated through conveniently located pressure fittings. It is well to remember, however, that the bearing surfaces and moving parts of a Cushman Chuck are fitted to extremely close limits. Not only is it important to lubricate at regular intervals, but the lubricant must be right and the chucks should be cleaned periodically to remove any abrasive particles, etc. which may have worked their way in.

These unretouched photographs of new jaws compared with a set recently returned for examination show how poor maintenance cuts down the life and accuracy of chuck parts.

We suggest that you show this advertisement to the foremen and operators in your plant. Cushman Chucks will repay you for a little extra care . . . with maintained accuracy and longer service life.

The Cushman Chuck Co. - Hartford, Conn.

CUSHMAN CHUCKS
A WORLD STANDARD FOR PRECISION

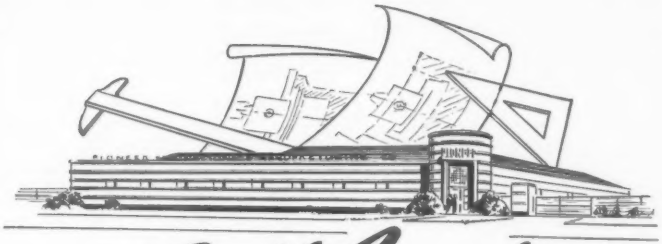
ALLEN BRADLEY COMBINATION STARTERS (E67)

A unique handle-locking arrangement and a compact, high-capacity disconnect switch are among several new features of a new line of Bulletin 712 combination starters recently developed by Allen-Bradley Company, Milwaukee. By combining a magnetic switch with a hand disconnect switch in the same enclosure, these starters save wiring, insure greater safety to the operator, and result in compact installation of improved appearance, it is said.

Combination Starter
Combines safety and compactness.

These starters are available in four sizes in a variety of enclosures, with or without fuse clips. Ratings range from 2 hp, 220-44-550 v for the size 0 to 30 hp, 220 v and 50 hp, 440-550 v for the size 3. All sizes have an interrupting capacity of at least ten times the maximum horsepower rating. Locked rotor currents are disrupted by either the solenoid switch or the disconnect switch.

The disconnect switch lever is located in the front instead of on the side of the cabinet. Hence, space required for a side-operated lever is saved. The cover cannot be opened unless the disconnect switch is open.



Still Growing

ADDITIONAL FACILITIES
PROVIDED IN THIS NEW BUILDING
BROADEN OUR ENGINEERING
SERVICES

WE MOVE into our new home. Only the many satisfied customers could have made this possible.

Word is spreading—each month sees new accounts added to our books.

Despite this increasing volume, we are not too busy to handle your work—no job is too large, none too small.

When you want to be sure to have something done, you generally ask a busy man—you can depend upon its being done right.

You'll find it profitable to come to us with such matters as processing and methods, designing of tools, fixtures, gages, special machinery, plant layouts, government proposals, etc., made necessary through the present emergency situation. Write us.

PIONEER ENGINEERING & MANUFACTURING CO.

19645 JOHN R DETROIT, MICH.

Send for Valuable Booklet

Forgings For All Industries
Rough Turned or Finished Complete

- Composite Die Sections
- Extrusion Tools
- Crankshaft Forgings
- Gear Forgings
- Die Casting Dies

- Rings, Discs, Blocks, Shafts, Hubs, Bars, and Special Shapes. Tool Steel of all Makes

S.A.E. Specifications

STAINLESS & COPPER FORGINGS

May We Serve You?

AJAX STEEL & FORGE Co.

205 ADAIR STREET DETROIT, MICHIGAN

Having difficulty holding tolerances?

DEMAND THE

ZIEGLER

ROLLER DRIVE
Floating Holder
for
Taps and Reamers

FLOATS RADIALLY

AUTOMATICALLY compensates for machine spindle misalignment, eliminating over-sized or bell-mouthed holes.

Helps produce unbelievable accuracy on both new and old equipment.

Furnished with male or female taper, straight, threaded or special shanks to fit any machine used for tapping or reaming.

W. M. ZIEGLER TOOL CO.
1920 Twelfth Street DETROIT

MATTHEWS RING MARKER (E68)

A new Time Train Ring Marker is offered by Jas. H. Matthews & Company, Pittsburgh. It is a small, compact bench mounting fixture, which is also suitable for marking fuses, beveled dials and other objects requiring graduation marking. The unit is custom built for the marking application, since the angle of the bevel varies greatly with each part that is to be marked.

The work holding spindle of the machine is designed to provide quickest handling and holding of each part to be marked. It cannot be standardized, because the shape of the part determines the holding means. Production will vary from 100 to 600 markings per hour, depending on the part. The part holder shaft runs in an eccentric bushing. By adjusting this bushing the part can be marked any depth.

Bevel gears at the rear of the device maintain correct peripheral spacing of the mark with extreme accuracy. These gears are of wide face to prevent any appreciable wear. There is nothing in the construction of this machine, it is claimed, which will get out of order. Bronze bearings are oversized, provided with oil holes. The frame is fabricated of machinery steel, with bearing standards fastened and welded. The handle is so proportioned that marking is made easy, and accomplished without fatigue, according to the manufacturer.

The marking die is so designed that necessary engraving does not occupy the entire periphery. A portion of the die is deeply undercut to permit the removal of the part being marked. Each part must be held to uniform tolerances of .002 inches to assure best marking.

PRIORITY
for Impact STRENGTH
● "Universal spindles of ordinary bronze failed through crushing out. AMPCO METAL renders very satisfactory service," writes an engineering company manufacturing heavy machinery for steel mills. A customer for 17 years, this concern is but one of many giving priority to AMPCO METAL for service under severe operating conditions.

AMPCO METAL is Famous for Licking the *TOUGH* Jobs

Ability to withstand the ravages of friction — to serve without "metal failure" for extended periods — to ward off peening and squashing out . . . these are prime considerations when a metal is selected for bearings, bushings, housing nuts and gear applications.

AMPCO METAL has proved itself in hundreds of installations. Over 2,000 nationally known concerns have standardized upon this sturdy aluminum bronze because of its high tensile strength, controlled hardness, high impact strength and marked wear-resistance. AMPCO engineers stand ready to help you. Write, outlining your requirements.

AMPCO METAL, INC., Dept. TE-6 Milwaukee, Wis.

CHICAGO POLISHING WHEELS (E69)

A new type improved soft rubber polishing wheel is being produced by the Chicago Wheel & Mfg. Company, Dept. T.E., 1101 W. Monroe Street, Chicago, Illinois. It is said that highly polished surfaces can be created on any base metal rapidly with this new product. Five different types of polishing compound are impregnated in a special rubber binder. In addition there is sufficient cutting grit to remove scratches and grinding marks from the piece being polished. On many operations the use of set-up wheels can be entirely eliminated.

No special equipment is required in using these soft rubber polishing wheels. They are available in a complete range of sizes including sticks and sheet form for hand lapping. Conventional dressing tools are used to dress the faces of wheels to any desired contour so that irregular shaped castings can be polished with ease. Any coolant which is not a solvent of rubber can be used when it would be desirable. The material is not suitable for polishing plated work.

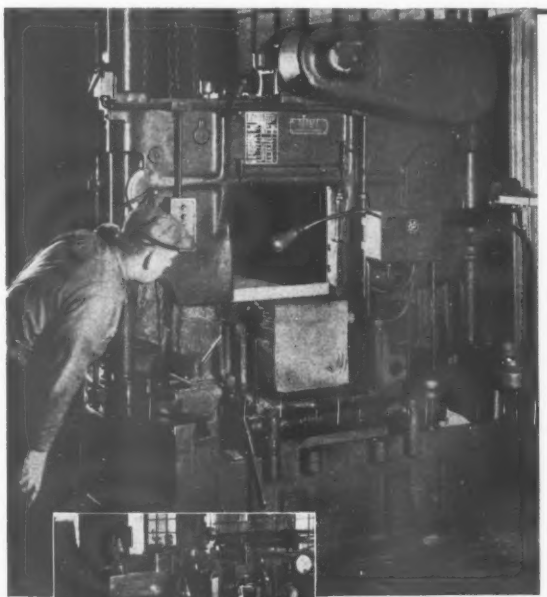
Pratt & Whitney Gage Addition

Pratt & Whitney Division of Niles-Bement-Pond Company dedicated the most modern addition to its already modern plant on May 24. Distinguished guests, including Army ordnance officers participated in the ceremony opening the $1,250,100 gage department, ground for which was broken less than six months ago.

Production began two weeks before the dedication and had already reached 80% capacity. The dedication included speeches by Clayton R. Burt, president of the company; Col. Frederick H. Payne, district chief of the Hartford Ordnance District; Lieutenant-Governor Odell Shephard; Mayor Thomas J. Spellacy; Col. E. A. Deeds, chairman of the board of Niles-Bement-Pond; Brigadier General G. M. Barnes; Charles M. Pond, vice president of the company; and William J. Walch, oldest employee of the gage department with a service record of 45 years.

The presentation of Mr. Walch to his audience of some 500 fellow workers climaxed the proceedings. He was received with a spontaneous standing ovation, joined in by all present.

During the inauguration and inspection of the Sheffield Corporation's new $1,000,000 plant addition at Dayton, Ohio, May 16, Brigadier-General G. M. Barnes, Assistant Chief of Industrial Service, Engineering, Washington, D. C. watched a demonstration of the new Sheffield Precisionaire. *Left to Right*, Lt.-Col. W. A. Borden, Assistant to General Barnes; Jack Shepherd, Service Manager at Sheffield; Brigadier-General W. P. Boatwright, Commanding Officer, Frankford Arsenal, Philadelphia; General Barnes; Louis Poock, President and General Manager of the Sheffield Corporation; and Major George M. Enos, Cincinnati Ordnance District. A week later General Barnes was in Hartford to open another new gage plant at Pratt & Whitney.



ABOVE: MARVEL No. 18.

LEFT: MARVEL No. 9A SAW.

Cutting off!

Size or Speed

Whatever your cutting-off problem, whether it's large size billets of tough alloy steel, or need for more pieces per hour cut-off from bar stock, the MARVEL System of Metal Cutting Saws provides the best answer. For large sized work the new MARVEL No. 18 giant hydraulic hack saw will make short work of cutting-off bars or billets up to 18" x 18" and some larger. It handles the toughest alloy steels with ease.

For quantity production of lengths or slices accurately cut-off from single or nested bars, no sawing machines or other cutting-off method can produce as many pieces per hour as the MARVEL Production Saw—No. 6A (capacity 6" x 6") and No. 9A (capacity 10" x 10"). These new heavy duty, all-ball-bearing "automatics" require no more operator attention than an automatic screw machine.

Write for descriptive bulletin.

● Photographed at the Charles E. Larson Co., Chicago.

Buy from your local distributor.

MARVEL SAWS

ARMSTRONG-BLUM MFG. COMPANY

"The Hack Saw People" 5700 Bloomingdale Ave., Chicago, U.S.A.

Eastern Sales: 199 Lafayette St., New York, N. Y.

New Literature

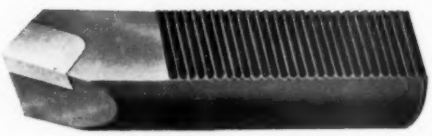
Of Interest to the Tool Engineer

(193) Tool Steels
Ryerson Steel Stock List. 268 pp. Joseph T. Ryerson & Son, Inc., Chicago, Illinois. A complete listing of all certified steel products carried in stock by Ryerson is included in this book. It also contains SAE standard specifications, a physical properties chart showing machinability of more than 50 steels, standard gauge comparisons, weight tables, and other helpful data.

(194) Power Shears
Niagara Power Squaring Shears. 24 pp. Niagara Machine & Tool Works, Buffalo, New York. An attractive catalog with large clear illustrations and complete specifications as well as description of power squaring shears with capacities from ten gage to one-half inch inclusive.

CARBIDE TIPPED BLADES
ARE MOST ECONOMICAL WHEN
USED WITH
LOVEJOY MILLS

You PAY for the carbide



You USE it in Lovejoy Mills

YOU get speed, production and economy when you specify Lovejoy Mills equipped with Lovejoy cemented carbide blades. Lovejoy Mills are designed to stand the strain imposed on them by the use of these blades, and to allow the use of practically the entire tip of this expensive material. It's features like these, that pay real dividends in cash and production, when you specify milling cutters and blades made by Lovejoy.

Have you received your copy of the newest Lovejoy catalog? Just ask for catalog No. 26 — there is no obligation.

LOVEJOY TOOL COMPANY, INC.
SPRINGFIELD, VERMONT, U. S. A.

(195) Special Machine
An Introduction to Three Point Design. Three four page folders. W. F. & John Barnes, Rockford, Illinois. These folders describe and give two examples of the Barnes method of designing special machine tools for particular operations.

(196) Steel Selector
. .New Quick Reference Tool Index & Steel Selector. 96 pp. The Carpenter Steel Company, Reading, Pennsylvania. This addition to the Matched Tool Steel Manual alphabetically thumb-indexes all types of tools and dies in general use. The various conditions each type of die or tool may meet in fabrication, heat treatment, and service are analyzed and specific tool steel recommended to meet each set of possible conditions.

(197) Small Tools
New Ideal Products. 24 pp. Ideal Commutator Dresser Company, 4152 Park Avenue, Sycamore, Illinois. This catalog includes live centers, grinding wheel dressers, variable speed pulleys, and a number of other products.

(198) Boring Machine
Simplex Unit Type Precision Boring Machines. 12 pp. Stokerunit Corporation, Milwaukee, Wisconsin. This bulletin illustrates and describes the Simplex single end, double end, three way, and four way boring machines.

HOW TO ORDER

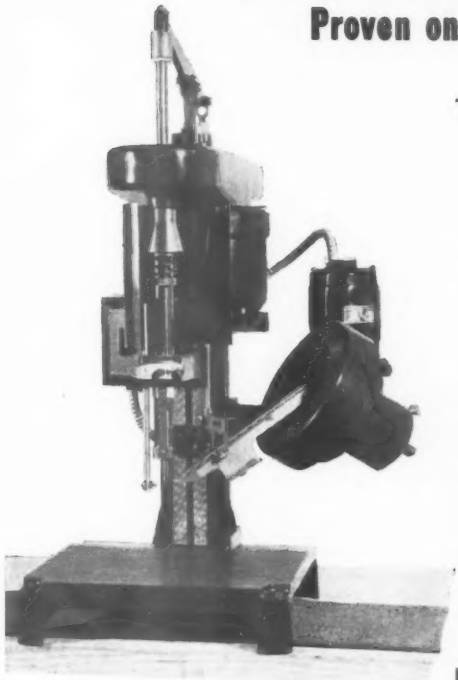
Booklets listed in these pages or information on new equipment may be obtained by using the post card bound in this issue. Merely fill out one coupon for each item desired, being sure to print plainly and to include position and company. Mail the card to us and you will receive the information desired at once.

(199) Sawing Machine
Hydraulic Feed Cold Sawing Machines. 8 pp. Motch & Merryweather Machinery Company, Cleveland, Ohio. Folder describing a high speed cold saw that is said to give square cuts without burrs.

(200) Measuring Machine
Fellows Involute Measuring Machine. 12 pp. The Fellows Gear Shaper Company, Springfield, Vermont. A completely detailed description of the uses of this machine, with illustrations and specifications.

(201) Flame Hardener
Fellows Flame Hardener. 12 pp. The Fellows Gear Shaper Company, Springfield, Vermont. Like the bulletin above this circular gives remarkably complete and detailed information.

POWER SCREWDRIVERS
For Today's Vital Needs
Proven on Industry's Toughest Jobs



MODEL A

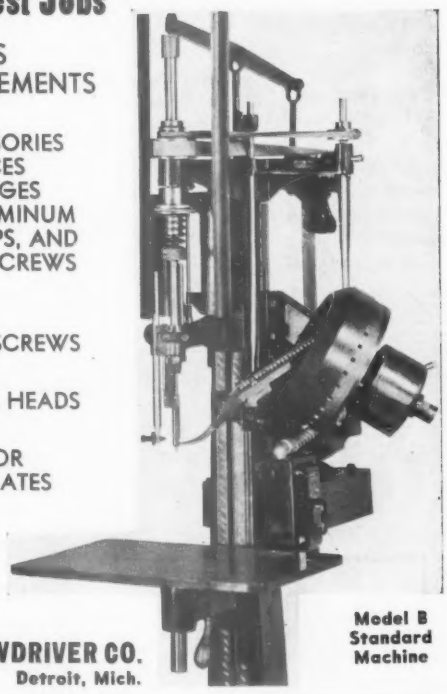
THREE MODELS
TO MEET ALL REQUIREMENTS

AUTOMOBILE ACCESSORIES
ELECTRICAL DEVICES
RADIO PARTS, GAUGES
PLUMBING PARTS, ALUMINUM
UTENSILS, HOSE CLAMPS, AND
ANY PARTS WHERE SCREWS
ARE USED.

No. 2 to 5/8" DIAMETER SCREWS

STANDARD OR SPECIAL HEADS

SEND SAMPLES FOR
PRODUCTION ESTIMATES



Model B
Standard
Machine

DETROIT POWER SCREWDRIVER CO.
5373 Rohns Ave. Detroit, Mich.

GET THESE FOLDERS
they may save your shop thousands of man-hours

LEARN how Cerro Alloys are speeding up a hundred different operations in leading metal-working shops.

CERROMATRIX—simplifies die construction, anchoring machine parts, making chuck jaws, and many other applications.

CERROBASE — simplifies reproducing master patterns, proof casting molds, electroforming, and many other applications.

CERROBEND—simplifies bending of metal tubes and mouldings, templates for spotting forming dies, engraving machine models, and many other applications.

CERRO DE PASCO COPPER CORPORATION
40 WALL STREET NEW YORK, N. Y.
BRITISH ASSOCIATES: MINING & CHEMICAL PRODUCTS LTD., LONDON
CANADIAN DISTRIBUTORS: DOMINION MERCHANTS LTD., MONTREAL

SIMPLIFIED INTERNAL GRINDING
with the MAJESTIC INTERNAL GRINDER

An exceptionally wide range of internal grinding jobs can be handled on the New Majestic Internal Grinder. Its simplicity of design and ease of operation are features of utmost importance in providing maximum grinding output at low cost.

SPECIFICATIONS

Length of table, 48". Swing over table, 10". Travel of cross slide, 2½". Precision dial graduated to .0001". Precision bearing work head. Speeds—100, 225, 350 r.p.m.

Write for complete details contained in New Bulletin

Majestic Tool & Mfg. Co.
2950 E. Woodbridge Detroit, Mich.

(202) Sawing Machine

Peerless High Duty Metal Cutting Power Saws. 12 pp. Peerless Machine Company, Racine, Wisconsin. Brief description and performance data on several Peerless models, also detailed specification.

(203) Pneumatic Products

Norgren Pneumatic Products. 24 pp. C. A. Norgren Co., Inc., Denver, Colorado. This catalog covers a full line of complete Lubro-Control Units for the control, cleaning, and lubrication of air wherever it is used in industry.

(204) Vertical Borer

Vernon Vertical Mill & Jig Borer. 4 pp. Machinery Manufacturing Company, 1915 E. 51st Street, Dept. TE 441, Vernon, Los Angeles, California. This folder fully covers technical details on the machine and its attachment.

(205) V-Belt Drive

Boltrim Multiple V-Belt Drive Data Book. 64 pp. Fort Worth Steel & Machinery Company, Fort Worth, Texas. This data book introduces the Fort Worth Boltrim sheave construction, a departure from the conventional design of integral hub sheaves. It contains practical data for assisting the designing engineer or plant engineer.

(206) Grinding Coolants

The Grinding Process and Its Dependence on Efficient Cooling. 5 pp. (Included in Oakite News Service for March-April 1941) Oakite Products, Inc., New York City. This article describes the principal types of grinding and explains some of the "why's" for the high status of this machining process in modern production. Considerable data is also given on the essential part that proper coolants play in assuring desired standards of accuracy.

(207) Electric Furnaces

Box Type Electric Furnaces. 4 pp. Hevi Duty Electric Company, Milwaukee Wis. This folder, conveniently punched for binder, contains a detailed description, illustration of features, and specifications of the several models of electric furnaces manufactured by this company.

(208) Spray-Finishing

Spray-Painting & Finishing System. 28 pp. The DeVilbiss Company, Toledo, Ohio. This catalog covers in condensed form the complete line for industrial use and brings all prices and specifications up to date.

(209) Material Handling

Clark Pictorial. 16 pp. Clark Tructractor Division of Clark Equipment Co., Battle Creek, Mich. This special defense issue shows the part which Clark material-handling equipment is playing in the Defense Program.

(210) Filters

Hoffman Kerosene Filters. 4 pp. U. S. Hoffman Machinery Corporation, Syracuse, N. Y. Illustration and description of industrial filters for supplying clean kerosene for lapping or honing, for washing precision parts, and for circulating systems.

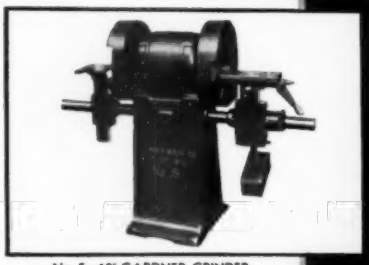
(211) Flexible Shaft Tools

Foredom Flexible Shaft Tools for Industry. 4 pp. Foredom Electric Company, New York City. This folder illustrates, describes features, and gives prices on a number of tools.

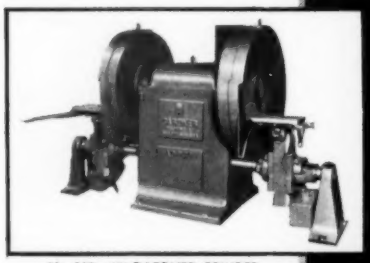
Book Reviews

Jigs, Tools & Fixtures. 210 pp. $4.00. By Philip Gates, Production Engineer. The Chemical Publishing Company, Inc., New York. In this book the author has endeavored to deal with the subject in a simple manner, covering at the same time as wide a field as possible. As a result the beginner should be able to

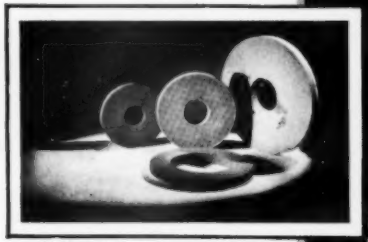
Get EXTRA CAPACITY
on many
flat surfacing jobs—*with*
GARDNER GRINDERS!



No. 5—18" GARDNER GRINDER



No. 230—40" GARDNER GRINDER



GROUP OF HEAVY-DUTY GARDNER WIRE-LOKT ABRASIVE WHEELS, BUILT FROM 1" TO 3" THICK.

THAT extra capacity which is the crying need of every manufacturing plant whose output is affected by the National Defense Program, can be obtained on many flat surfacing jobs by diverting some of them to Gardner Disc Grinders.

For 35 years, these tools have been handling certain types of flat surfaces more rapidly and economically than milling machines, shapers, planers, or other standard machine-tools. Today, with Disc Grinder deliveries considerably better than those of many other types, GARDNER-GRINDING is more and more becoming the solution to many a production problem.

Standard Single Spindle Gardner Grinders, for example, are available in sizes from the No. 5-18" three horse-power unit, to the huge 40" machine seen at the left. All carry modern, heavy-duty Gardner WIRE-LOKT Abrasive Wheels, all are adapted to many flat surface jobs, and all sizes of this type machine can ordinarily be furnished many weeks sooner than you can get most types of machine tools.

For details on Standard GARDNER GRINDERS, write for Bulletin 200B!

GARDNER MACHINE COMPANY
442 East Gardner St., Beloit, Wis., U. S. A.

Chicago Rawhide Mallets and Hammers are the best tools you can buy for protecting surfaces when they need to be pounded.

Genuine Java Water Buffalo Hide will not split, crack or break. The hydraulically compressed heads of Chicago Rawhide Mallets and Hammers are safe to use and safe to handle. Hammers have replaceable faces in malleable iron heads. These economical tools are made in sizes and weights for every purpose. You can get them through your dealer. The next time you buy, ask for Chicago Rawhide tools.

CHICAGO *Rawhide* MFG. CO.
1393 ELSTON AVE · CHICAGO · U·S·A·

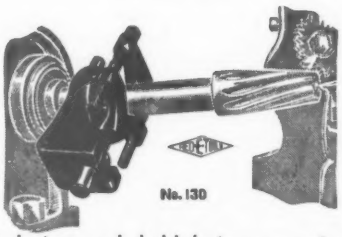
GAMMONS OF *Manchester*

PRODUCTION TOOLS

ORIGINATORS AND MANUFACTURERS OF HELICAL FLUTED TAPER PIN REAMERS

THE GAMMONS-HOLMAN CO., MANCHESTER, CONNECTICUT

NO *LOST MOTION* HERE



When indexing work held between centers the RED—"E" milling machine dog assures accurate spacing with ***no lost motion.*** A sliding ball and socket universal joint also eliminates binding or cramping with accurate indexing without the use of shims.

Investigate now—write for catalog E-41

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585 IRANISTAN AVE.
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FOR YOUR EVERY NEED ON —

HYDRAULIC

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HYDRAULIC MACHINERY, INC.
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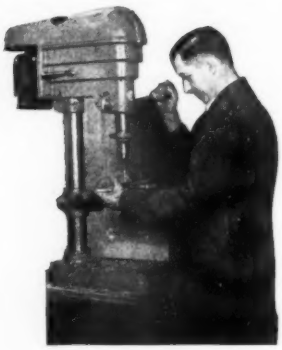
understand the book thoroughly with careful study, while the experienced designer should be able to pick up some new ideas. Chapters are included on drill jigs, milling fixtures, chucks and turning equipment, cutters, screwing equipment, gauges, press tools, cams, and special equipment. Among the chapters dealing with other phases are two new chapters in this new edition on mechanical drawing and material. The book is printed by the Replika Process.

A Good Mechanic Seldom Gets Hurt. By H. R. Graman, Machine shop instructor and assistant supervisor of National Defense Training, Parker Vocational High School, Dayton, Ohio. 94 pp. $.50. American Technical Society, Chicago, Illinois. This book on machine shop safety is particularly appropriate in these days when a great many new men are going into industry. It is very cleverly written, and should sustain the interest of the reader. Three fellows called Safety Joe, Accident Moe, and Careless Boe, prance through its pages and somehow manage to drive the safety rules home better than could a detached treatise.

Helmet Heads SPEED JOBS • REDUCE COSTS

BOICE-CRANE
Helmet Heads
FOR EVERY TOOLING NEED

They offer you the easiest, least costly, and most satisfactory method of tooling light drilling and tapping jobs. Complete line of varied types, deliverable on short notice ready to run.
Investigate them!



OVER 60 DIFFERENT MODELS

BUILT TO OUTLAST

Helmet Heads *(made only by Boice-Crane)*, are **better** light drilling-tapping machines . . . you know, the ones famous for larger capacity, with that huskier quill that has the big oversize bearings.

You'll find Helmet Heads *(with their design patented head giving more rigidity to the quill)* in the countries largest defense industries.

GET THESE TWO BOOKS NOW!

POWER TOOL CATALOG. Lists 10 different types of industrial Power Tools that do many jobs faster and better. A valuable piece of literature.
DRILL PRESS FOLDER. Lists all types, also heads and parts for special machines, accessories, etc. **Write Today!**

BOICE-CRANE CO., 934 W. Central, Toledo, O.

BOICE CRANE COMPANY • TOLEDO OHIO

Handy Andy Says—

AS you probably know, I'm inclined to be rather shy and retiring. Never did like to assert myself, which goes to show that I'm not temperamental like most Tool Engineers who, as Ford Lamb says, must be handled like prima donnas. Imagine that! Anyway, my modest disposition finally got me so worried that I couldn't sleep days, and that got the Old Man worried. He thought I was sick, or slipping. Then, a while back, one of the boys showed me in a paper where one of these, now, handwriting experts would analyze your character, personality and all that for a thin dime. Dared me, the son-of-a-gun! So, dreading the worst, I nevertheless sent in the coin along with a few lines in my flowing, legible style that Roy Bramson and Otto Winter read so easily sometimes. And what do you think! The lady (yep she's a femme) analyst makes me out a sort of John L. (short for Ad Lib) Barrymore but sans *the* profile.* She says I have a fine sense of the dramatic and magnetism galore, and that I think so fast my pen can't keep up with my thoughts. (Take that, R. B. and O. W.!) Well, that settles it. I'm all through being a blinking glow worm and will henceforth blazon my oomph (or whatever it is) in lurid neon. And just think, all that for a dime! Thanks, Muriel; George Whitehouse won't laugh when next I sit down to the piano.

▼ ▼ ▼

Oh yes, I almost forgot! She said, among other things of a personal nature that we agreed to keep a dead secret between us, that I'd make a good salesman if I had real confidence in the product. Well, there may be something to that. For the past few years I've been trying to sell this A.S.T.E. to the boys North, East, West, South, and perhaps my spiel hasn't been entirely wasted. But then, I've had unbounded faith in the Society and the things it has stood for. It's a grand order, and sales talk has been backed by real quality. Oh sure, there is occasional irritation and disagreement, as when issues are bandied in the heat of debate, but that is but a symptom of growing pains; a bit of the oil of good fellowship which permeates the Society and a transient pain

*Compare with above. And Roy, we'll have to delete the silhouette or bring the hair line back an inch or so. Lost 43 hairs since it was made. Out, damned spot!

SPEED UP YOUR PRODUCTION
WITH THESE ULTRA FLEXIBLE TOOLS

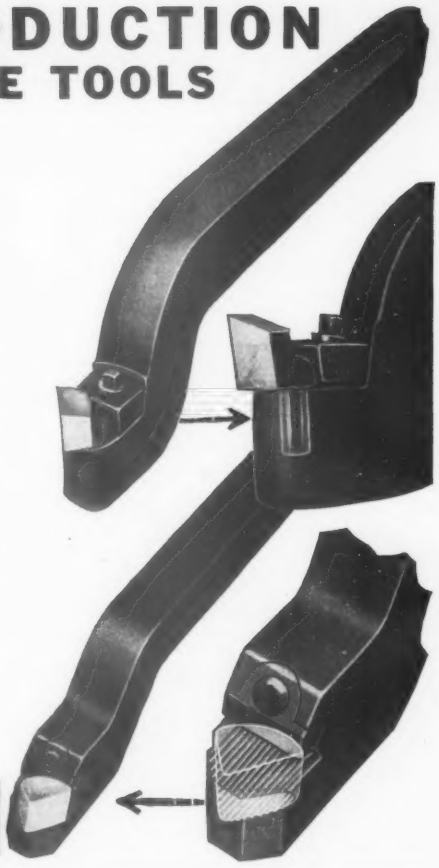
A remarkable flexibility of use recommends O K Inserted-Blade Metal Cutting Tools to any industry where schedules must be met on time without loss of revenue.

O K Inserted-Blade Metal Cutting Tools promote both speed ***and*** economy. Only the bits are made of the more expensive high speed cutting steel. The bodies are made of chrome nickel steel, specially heat treated for strength. The bits are readily adjustable in line of wear, which preserves the original size of the tool and promotes accuracy. New bits can be inserted and in use while dull ones are being reground; and, as these bits are obtainable for every type of metal cutting, much of the need for special shapes can be eliminated.

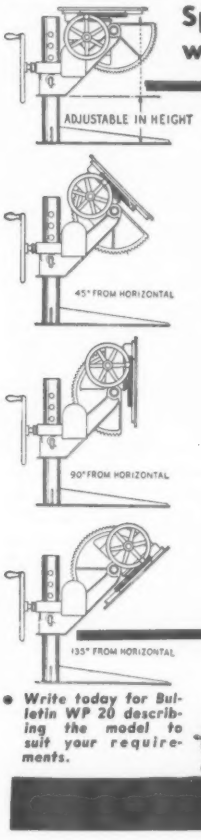
O K Single-Point Tools embody various locking designs. In some, the bits are held in mated serrations, in others round-shank bits are locked in a drop seat, in others the locking devices are still different. In O K Multiple Cutters, the blades are driven into mating slots in the body, where they lock automatically and positively, without wedges, pins or set screws.

Technical details on request

THE O K TOOL COMPANY, SHELTON, CONN., U.S.A.



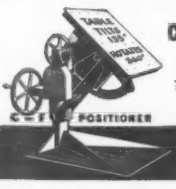
TRADE O K MARK — INSERTED-BLADE METAL CUTTING TOOL SYSTEM



Speed up your production welding on a C-F Positioner.

- Your welders time will be more productive, your welds will be of better quality and you will save in many ways by fastening your welding assemblies to a C-F Positioner for maneuvering them top, bottom and sides for "downhand" welds with just **one** set up. To the left are diagrams showing the tilting feature of C-F Positioners. The table also revolves 360 degrees and is adjustable in height on a portable or permanent base. C-F Positioners are built in hand operated or motor driven models in capacities from 1200 to 14000 lbs.

- ***Write today for Bulletin WP 20 describing the model to suit your requirements.***

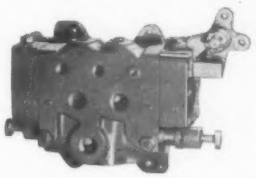


CULLEN-FRIESTEDT COMPANY
1318 S. Kilbourn Ave.
Chicago, Illinois

OILGEAR
fluid power
VALVES AND CYLINDERS

GIVE *HIGH EFFICIENCY* OPERATION

Oilgear Valves and Cylinders are precision-made for long life high efficiency operation. Their unusually long piston seals keep power leaks down to a minimum. Further power conservation is effected by the large unobstructed oil passages in each unit. Extremely close tolerances in the construction of Oilgear Cylinders make possible their close working fit. Get the proof of the efficiency of Oilgear Fluid Power Valves and Cylinders. Write immediately for technical data. THE OILGEAR COMPANY, 1312 W. Bruce Street, Milwaukee, Wisconsin.



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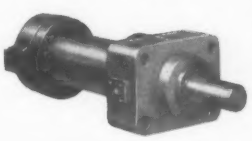
Directional control, Pilot, Combination, Relief, Foot, Resistance, Surge, Air Drain and special custom built types.



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Two series . . . for pressures to 1350 or 3000 lbs. per sq. in. Small and large rams. Lug, foot, flange and many special mountings.

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is forgotton. As one defeated candidate for office put it: "So what? The game's the thing. Anyway, this thing is bigger than the individual, and I'll just keep on working". That is the fine thing about this fellowship, that occasional disappointments are subordinated to the good of the order.

▼ ▼ ▼

Boss Kettering of G.M. talked to a Detroit group of budding engineers the other day, and in the course of the talk debunked highbrow education in general. Well, that's all oke when a guy like Boss K. tells it, because he's got plenty under his dome and we all know he's only kidding. For education counts, and it's going to count more and more which is why pluggers for advancement crowd our evening schools. Only, it's just like Boss K. implies; education of itself isn't worth a tinker's dam in making a living unless it can be practically applied. Perhaps that is what has made this A.S.T.E. click. The composite body has the education and applies it where it does the most good. It also has the practical back ground, so that vision does not transcend the possibilities of fruition, which explains the way we've grown from the original bud. (By the way, fill out that application blank if you're not already a member. Grow along with us.)

Here is something I'll pass along to possible fellow sufferers. Lately, I got a rash on my hands, little blisters full of water that spread and, drying, left the skin scaly and sore. "Occupational disease", says Doc. "Probably from handling blueprints". Prescribed, but no go; the condition got worse. Along comes Dave Carlson, who sells for Standard Tool, of Cleveland, and I had to explain why I wouldn't shake hands. "Don't want to infect someone else". "Let's see". Dave looked at my hands. "Uhuh. Been handling any oak or hickory of late?" "Ye-es." Thinking it over. "Garden tools, and playing with cabinet work". "Well, lay off for a while, or wear gloves". I did, and the rash subsided. Later, I found that the best cure is a solution of photographer's Hypo, allowed to air dry on the skin. Anyway, I'm indebted to Dave, who incidentally is a fine salesman with a quiet, friendly personality that goes over. And, among discerning people, that wins recognition.

▼ ▼ ▼

I see where Chrysler Tank Plant delivered its first cross country buggy to Uncle Sam three months ahead of schedule, which goes to show what industry can do with practical men running the works. That's what we need right now, production from the shops and less wind from Washington. Which reminds me that some of the boys are all het up because small tools, as drills, taps, dies and cutters have been put down at the foot of the priority list instead of in the first division where they belong. You know, it's all right to give a clear track to the machine tools, but they'll never get there unless supplied with the all essential cutting tools. Yep, education's wonderful when it teaches you not to make the same mistakes twice, but somehow it seems that a lot of lessons that should have been learned in the last international debate are just wasted on the present crop of academic sticklers-for-code. Turn the job of preparing for whatever the Great White Father has in mind, over to practical men with technical education, and we'll have more production and less of red tape off the line. And perhaps a two fisted individualist or two wouldn't set so bad in keeping the wheels rolling.

▼ ▼ ▼

Personally, I deplore the curtailment of automobiles and the production of

SPEED CASE STEEL
A LOW CARBON OPEN HEARTH PRODUCT
Assures You . . .
1. PHYSICAL PROPERTIES
Tensile 70–85000 PSI Yield 60–75000 PSI El. in 2" 17-22% R A 52-60% for 1" Round cold drawn bar. Excellent shock and fatigue values.
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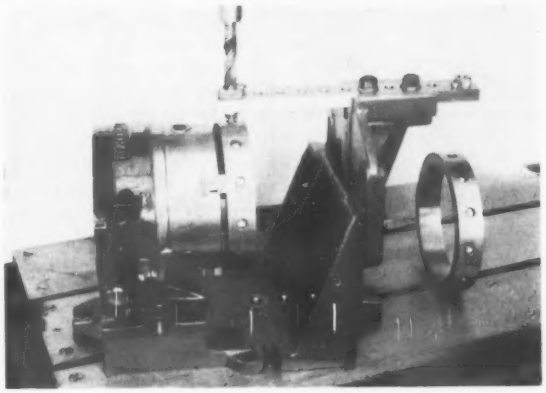

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● If you haven't a Hartford Super-Spacer in your shop—investigate, promptly, its many money and time saving advantages. If you already have it, then get the facts on this optional accessory, brand new, a real adjunct in many troublesome jobs—particularly where much radial drilling is being done. This new tool completes a wide range of jobs possible with the Super-Spacer, reduces set-up time to almost nothing, handles wide variations in both diameter and length.

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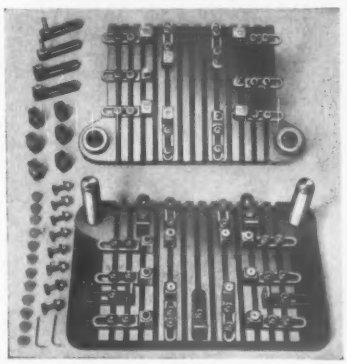

★ Whistler adjustable dies permit minimum perforating centers of ⅞".

★ Dies for perforating holes from ⅛" to 1½" in mild sheet steel to ⅛" thickness shipped from stock. Larger sizes on order.

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WHISTLER ADJUSTABLE PERFORATING DIES

peacetime goods in general. In my opinion, such curtailment is not necessary and defeats the very purpose for which nations, our own included, wage a war. For stripped of all verbosity, one contending power strives for economic parity while another would retain economic advantage; as for us, our economic structure has largely been reared on the production and sales of commodities that enhance the standards of living. The cess on these goods can sustain the armament program even though the tax burden becomes onerous, whereas the defense program is an expense account that cannot carry itself. The workers of the nation cannot buy ships, tanks and cannon with their earnings, but they can buy the necessities of our scheme of living which some brain-stormer has dubbed luxuries. As long as these things are produced in quantity we can promote mass wealth and support arms production indefinitely. And we have not, as yet, shown any material absorption of the millions of idle, nor are we adequately operating the thousands of small shops that are begging for work. Neither are we adequately using our potential man power; picket lines, shuffling around defense plants, do not produce goods. Incidentally, they're not milling around the plants of the Axis powers, which now comprise 260 million people. Somebody needs to wake up. An open letter to Irwin F. Holland, Nat'l. Editorial Chairman.

Dear Irwin:

Greetings of the Season. It's Springtime; the sap is flowing and the birds and the bunnies are that way. The trees are abloom and riant rills tumble through glens redolent with the cloying odor of convaleria. It fills my heart with yearning for sylvan glades and yon greening lea where the anemones nod and where the drone of bumblebees would lull me to rest were I only there. Poetic, what?—the quintescence of beauty, as Ill Douche's young hopeless said when he dropped the pineapple on Ethiope's dusky hillbillies. Not that spring means much, these days. Before me, as I envision all this with my subconscious, is spread a maze of lines that only a Tool Engineer would conceive but which will eventually resolve itself into a new and useful gadget. That explains how I get this way. Oh h—No no! I mean, Oh dreams that Wilderness were Paradise enow!

What I started to tell you when I got sidetracked is that Lee Diamond, Detroit Ch'man, has kindly relieved a certain party of the chore of editing for No. 1. The job has been taken over by Paul Darling, who chief engineers for Midland Steel. You'll find Paul a swell fellow with a ready laugh and an infectious smile, plus a yearning to emulate Dickens. I am sure you'll like him and that the two of you will click like Damon and Pythias or any two of the Three Musketeers.

Hoping this finds you well and happy and not suffering too much from Spring Fever, I am

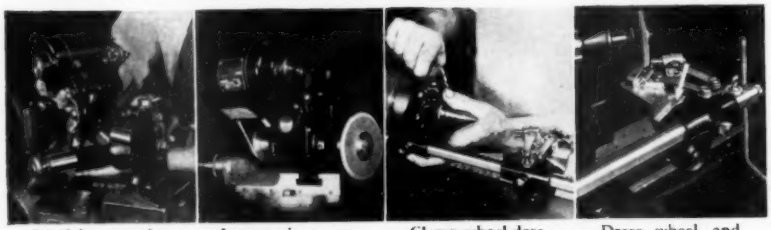
Handily Yours,

A. E. Rylander

A Nation at War

In Canada, the United States has an example close at hand of a nation at war. To depict the effects of this effort upon the nation and to show the production methods employed THE TOOL ENGINEER for July will present a special section upon the subject "Canada: A Nation at War."

Now...Grind Threads Accurately ON A LATHE



Special mounting post is furnished. Instructions are "easy-to-follow." Clamp wheel dresser to tail stock. Dress wheel and you're all ready.

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» » A.S.T.E. DOINGS « «

By IRWIN F. HOLLAND

Baltimore

The regular monthly meeting was held on Wednesday May 7, 1941 at the Engineers' Club in downtown Baltimore. Approximately 75 members and guests were present. No dinner was served, but after the meeting and show very good "refreshments" were served to all present.

There was no speaker at this meeting —just a movie; an excellent one. A dramatic sound film story photographed in natural color, and showing the entire history of Plastics, entitled "The Magic of Modern Plastics" was shown. The manufacture of typical plastics through all its stages was shown. Plastics testing was also shown, plus all the latest data on the coloring of the plastics. The film was shown through the courtesy of "Modern Plastics" Magazine.

This was the last meeting—summer recess. The meetings will again be resumed in September, 1941. The Chapter is planning a summer "get-to-gether" but no definite date has been set as yet.

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Boston

The May meeting of the Boston Chapter was held on the 15th at Eastman Bldg., M.I.T. The meeting was preceded by dinner at Walker Memorial. About 250 members and guests attended. New officers were installed and new members introduced. Several members of the Worcester Chapter were guests. Ray Morris of Hartford, new 2nd Vice President of the National Society challenged the Boston Chapter to send a golf team to meet the Hartford Chapter team.

Mr. Clarence G. McDavitt, Upper New England representative, Labor Division, O.P.M. spoke on training of operators for defense work. Our own Jack Savits talked briefly of his tie in with O.P.M. and CO-Defense Education.

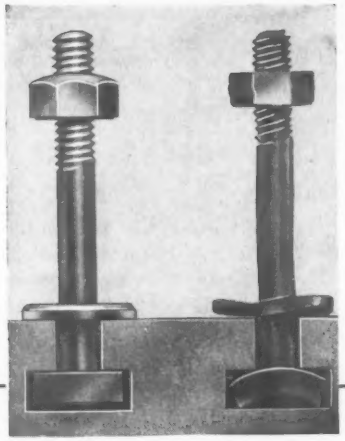
Mr. Warren Ames, President of B.C. Ames Co., and Mr. Leroy W. Macomber, Head of Standardization Department, River Works, General Electric Company, held a discussion type meeting on Dial indicators. Accuracy curves for indicators and deflection curve of $\frac{3}{8}$ rod in various lengths, plotted against grams force were shown and created much interest. A testing machine to determine friction of indicators was demonstrated. This was perhaps the liveliest meeting ever held by Boston Chapter. An unusual number of questions were answered by Mr. Ames, Mr. Macomber and representatives of three other dial indicator manufacturers, Standard, Federal, and Starrett.

Chicago

Dinner was served at 7:00 P.M. The meeting was called to order at 8:00 P.M. by Chairman Cook, who reported on the ASTE Show held in Detroit the week beginning March 24.

Frank W. Curtis, President of the Society, installed the officers of the Chicago Chapter for the new year. The following officers were installed: Chairman, S. G. Goransson; Vice Chairman, Cecil C. Waldow; Secretary, Fred J. Schmitt; Treasurer, Harold M. Taylor.

The secretary read some announcements and asked for addresses of mem-



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Bolts of mild, untreated steel soon look like the bolt shown at the **right** in the picture. You can imagine the damage such bolts can do to costly machine tools.

The Bolt on the **left** is a Boyar-Schultz SMB Bolt. It is made of heat-treated Chromium Molybdenum Steel with head machine square with the body presenting a clean, flat surface to the upper part of the T-slot. Threads do not easily strip.

For best results with SMB Bolts use SMB Nuts and Washers.

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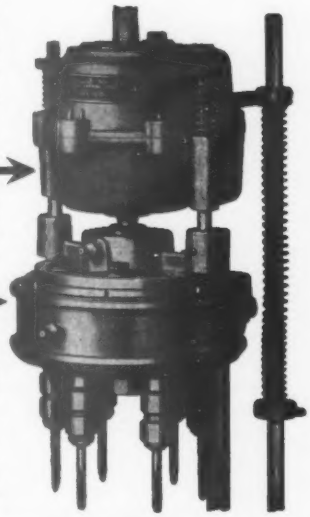
1. The basic part of every Ettco - Emrick tapping head is this ***standard*** friction clutch and face plate driving unit equipped with a taper shank to fit the drill press spindle. The feature of a single central clutch — renewable if need be in a few minutes—is an important advantage in multiple tapping. To change from tapping to drilling this driving unit is simply replaced by a standard face plate and taper shank unit for direct driving.



Ettco-Emrick Heads are readily applied to any drill press

2. A big feature of the system is this gear case assembly made entirely of ***stock*** parts arranged to fit specific tapping or drilling requirements. Each case is a complete unit, and can be interchangeably bolted to the face plate of either the tapping or the drilling drive unit. No need to point out how quick and easy this makes it to change from one tapping or drilling set-up to another.

ALL YOU DO to get a multiple head made up for one of your jobs is send us a drawing giving center distances and essential data about tap and drill sizes, etc.—and if practical, a sample part. We do the rest.

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Unexcelled for Design, Materials and Workmanship

bers whose mail addresses are incorrect on the records.

Mr. C. B. Cole announced the new national officers.

Chairman Goransson introduced Mr. E. W. Dickett of the Rockford Chapter, who is the Chairman of the Membership Committee for the new year. The presence of about thirty students from Armour and Lewis Institute was recognized by the Chapter.

Chairman Goransson introduced the speaker of the evening, Mr. Frank W. Curtis, Chief Engineer, Milling Machine Division, Van Norman Machine Tool Company, who spoke on the subject "Tool Engineering Applied to Tool Design". Mr. Curtis' talk was illustrated by slides through the assistance of Mr. Clifford Ives. The article entitled "Tool Engineering Applied to Tool Design" has already appeared in the March, 1941 issue of THE TOOL ENGINEER. Chairman Goransson introduced Mr. Louis Biehler, who was formerly chairman of the Los Angeles Chapter, and who is now located in Chicago as Assistant Works Manager of the Aircraft Division of Pullman Standard Car Company, Chicago, Illinois.

A very interesting question and answer period preceded adjournment at 9:45 P.M.

Dayton

The Dayton Chapter enjoyed one of the finest meetings in its history on May 12 when, they were hosts to the Dayton Sec. of S.A.E. in a combined meeting. There were 266 members and guests present. The meeting was opened by Chairman "Whitey" Poock with remarks of welcome. He was followed by R. V. Kerley, Chairman of Dayton Sec. of SAE who in turn presented the toastmaster, Frank H. Irelan, President and General Manager of Delco Products Corporation.

"Irish" then introduced Mr. A. T. Colwell as the National President of "Society of Awkward Engineers." Mr. Colwell gave an excellent talk on "Behind the Scenes in National Defense Engineering" in which he stressed the importance of controlling strategic materials and the amount of engineering effort which is being spent on the development of substitutes and synthetics to meet the emergency. Some very interesting developments in plane design and fire-power were described and compared with similar developments by the Axis Powers. In one interesting statement he revealed that only 6¼% of the industrial facilities of the United States is being devoted to armament, while Great Britain and the Axis Powers both average 60%. This led to the keynote of his talk, "Don't Sell America Short", and the definite statement that the production capacity of the United States has been greatly underestimated.

Detroit

Detroit Chapter met at the Detroit Leland Hotel on Thursday, May 8. After an excellent dinner, and some talented accordion playing by little Elsie Gould, Clyde Hause was presented with a gift, a token showing the appreciation of the members for his outstanding work during the past year as Chapter Chairman. Al Sargent, President of Pioneer Engineering and Manufacturing Company, and past National Secretary, also was presented with a gift in appreciation of his untiring efforts on behalf of the A.S.T.E. Bert Carpenter, Chairman of the committee on arrangements for the forthcoming Golf Tournament, gave us an inkling of the good time in store for us at this event. Clyde Hause also indicated that plans for a moonlight cruise during the coming season are well under way—and will the gang come aboard!

Mr. Scott, Chief Engineer of Ampco Metal, Incorporated, Milwaukee, Wisconsin, gave a very interesting talk on

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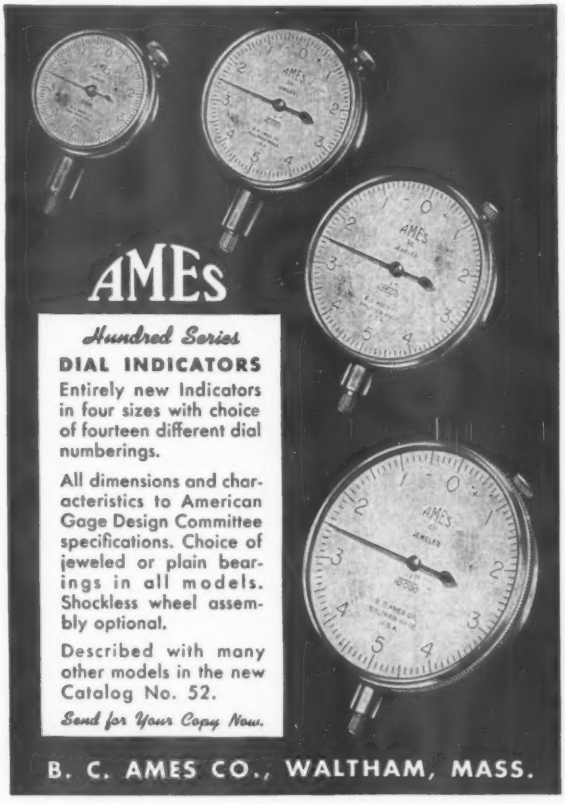
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Entirely new Indicators in four sizes with choice of fourteen different dial numberings.
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"Bronze". The talk was preceded by a fine color movie, showing the methods in use, and was further illustrated by slides.

Western Michigan

The Western Michigan Chapter held its regular May meeting Monday, May 12 in the Browning Hotel in Grand Rapids. The supper meeting was attended by 80 members and their guests. At the business meeting, Mr. Monahan, our chairman, announced that Mr. Butterfield our secretary had entered the Service, and it was necessary for a new secretary to be appointed. Mr. Roossien was appointed acting secretary. The program chairman, Mr. Randall, introduced the speaker of the evening, Mr. E. J. Abbott, of the Physicists Research Co. His subject "Designation of Surface Finish" was illustrated by slides, which graphically showed the difference between various types of finished surfaces. To climax the evening lecture, he had brought one of the surface testing machines along. This was set up and the dial showing the surface roughness was thrown on the movie screen. This was very interesting as all could see the irregularities of the several pieces or samples used in the lecture. Several questions were asked as to the uses of this equipment and its advantages.

A vote of welcome was given a delegation from Marshall, Michigan. The meeting adjourned at 10:45.

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Do in MINUTES jobs which otherwise require HOURS!

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THICKNESS	CAST IRON	COLD ROLLED	TOOL STEEL	HI SPEED STEEL	HI CHROME HI CARBON
¼"	16"	9"	5"	2⅜"	1½"
½"	8"	4½"	2½"	1⅛"	¾"
1"	3½"	2¼"	1¼"	½"	⅜"
1½"	2"	1"	⅝"	5/16"	3/16"
3"	1"	½"	5/16"	5/32"	3/32"
6"	½"	¼"	5/32"	5/64"	1/32"

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Hamilton

Hamilton Chapter held its April meeting at the Royal Connaught Hotel, Hamilton, on April 17. There were about one hundred and two present at the dinner and approximately one hundred and thirty-five at the evening meeting, representing Hamilton, St. Catharines, Welland, Niagara Falls, Dundas, Galt, Guelph, and Brantford.

Two National Officers were present, Mr. Otto W. Winter, First Vice-President and Mr. Ford R. Lamb, Executive Secretary.

The Temporary Chairman introduced the National Officers and turned the meeting over to Mr. Winter, who addressed the Chapter, his subject being "The Aims and Objects of the A.S.T.E." Mr. Winter then introduced Mr. Ford Lamb, who explained the operation of the Society and outlined the qualifications necessary for membership. Mr. Winter then resumed the chair and proceeded to conduct the election of officers.

The slate of officers prepared by the Nominating Committee was presented and nominations were also invited from the floor. After the nominations, elections followed, and the officers were then installed by Mr. Winter who administered the Oath of Office and presented Chairman W. A. Dawson with the Charter of the Chapter, No. 42, also the Constitution and By-Laws of the Society.

Mr. Ford Lamb then presented the other officers with the Chapter Record Books and instructed them in the duties of their offices.

At the conclusion of the Installation ceremonies, Mr. Winter turned the meeting over to the new Chairman, who outlined the program of the Chapter for the coming year.

The Chairman then introduced the guest speaker, Mr. R. H. Bruce of the Gisholt Machine Company, who delivered an address illustrated with slides on the subject "Turret Lathe Tooling." A hearty vote of thanks was tendered Mr. Bruce.

Hartford

The Hartford Chapter held its Aeronautical Night at the City Club on May 5. Two hundred sixty-nine sat down to dinner and over four hundred attended the meeting. Mr. Cedric Foster, Manager, Radio Station WTHT, gave a talk

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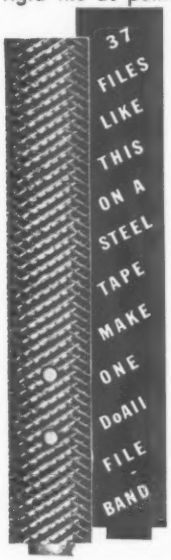

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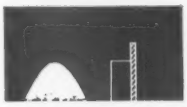

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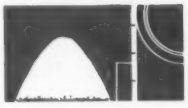

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HIGH SPEED STEEL

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- No honing.
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- Cannot fall in slots or oil grooves.
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entitled, "America's Naval Air Base at Bermuda."

Mr. Igor I. Sikorsky, Engineering Manager, Vought-Sikorsky Aircraft, gave a 15-minute broadcast over Station WTHT on "Recent Developments in the Direct Lift Aircraft." His speech was followed by a radio talk by Major Willis Fitch, General Chairman, New England Flying Cadet Committee, on the Army Air Corps Flying Cadet Program."

After a short intermission, Mr. Sikorsky spoke on the "Present and Future of Flying." During his talk he traced the progress of the aeroplane from the beginning and showed an artist's conception of the ship of the future. He predicted that aeroplanes of 1000 ton capacity, capable of carrying four or five hundred passengers, are entirely within the realm of possibility, using materials and engineering knowledge now available at the present time.

Mr. Sikorsky showed colored motion pictures of the VS300, the helicopter in which he recently stayed aloft for an hour and five minutes, setting a new world's record. This picture certainly demonstrated the possibilities of this type of ship, and Mr. Sikorsky predicted a wide use of this type of ship within the next decade or two.

Past National President, A. H. d'Arcambal acted as master of ceremonies, and we were honored by the presence of our National President, Frank Curtis, as well as by the presence of the heads of the leading manufacturing companies in Hartford and the heads of several local engineering societies. We are indebted to Kenneth Thomas and A. H. d'Arcambal for the completeness of the arrangements and the highly successful manner in which the meeting was handled.

The Worcester and Springfield Chapters were also well represented.

This was one of the most successful meetings ever held by the Hartford Chapter.

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3 NEW CARBIDE GRINDERS
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Houston

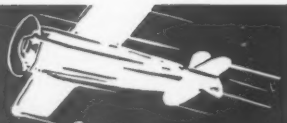
The regular April meeting of the Houston Chapter was held at the Golfcrest Country Club with one of their very fine dinners opening the ceremonies at 6:30 P.M. A goodly attendance was on hand with a number of visitors spending the evening with us.

Through the courtesy of the local U.S.N. Recruiting Office, Chief Petty Officer Scheer in charge, the Chapter was taken on an imaginary trip through some of our Naval Air Pilots Training bases and also on a Navy gunnery practice cruise under actual battle conditions which was thoroughly enjoyed by everyone.

The feature of the evening was a "Vox Pop" program, the invention of our new Vice-Chairman, genial H. W. (Rip) Collins, assisted by a very capable Master of Ceremonies, our new 1941 Chairman, L. M. (Red) Cole. Seven questions pertaining to the art of tool engineering were put to each guest before the microphone. Prizes ranged from $1, $2, $4, $8, $16, $32, and $64 (in trade goods of course). The items were letter openers, drill grinding gages, automatic pencils, small cans of cutting oil and books on technical subjects.

There were very few consolation prizes and from the way the questions were breezed through, the members of the Houston Chapter have been hiding their light under a tub, as it were, which of course was due to their Texas timidity. Who ever heard of a timid Texan? The climax of the evening was brought about when the final and Jack-pot question was put to the members and they answered on slips of paper. The answer to this question hidden way back in ancient Greek history and *every answer* was correct.

Our M. C. was on his toes like a professional and the Net Work talent



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scouts may draft him any day now. The evening was voted a big success.

Los Angeles

In keeping with the traditional practice of boosting California and California products, the Los Angeles Chapter had as one of the chief attractions a demonstration of the Bakewell tapping machine, at its meeting May 8, at Scully's Cafe. The evening began with an informal but interesting talk by Mr. H. F. Bakewell, who directed the attention of the Chapter to a full size model of the machine which had been set up on the floor. He told of his own necessity in meeting a knotty tapping problem which brought about the production of the Bakewell tapper, and of the response of industry to it.

He then led the crowd to the plant, where a number of the machines were seen in actual operation, and where a night crew was busily getting out the tappers.

Another feature of this meeting was the group of reports of the various committees who are working on the plans for the blow-out to be held at Santa Monica Deauville Club, at Santa Monica, Calif., on the evening of June 6. Although an informal affair, this event is to be a dinner-dance with a full evening of entertainment. They promise sparkle, and glamor, and fun and lots of it, and agree to produce something which is a credit to the Chapter. The head man of all the committees is Bob Garwood, and he has gathered together a group of workers to put it over in a big way.

In spite of the fact that a lot of the members are working overtime, the Los Angeles Chapter continues to seat upwards of a hundred and twenty-five at its monthly dinners, and usually a number of men come in later, but in time for the technical sessions. There is a reason.

Milwaukee

The May meeting of the Milwaukee Chapter, held in the Colonial Room, Republican Hotel, on May 8, took the form of a plant visitation at the Seaman Body Plant of the Nash Kelvinator Corporation.

Minneapolis-St. Paul

The Twin City Chapter held its May meeting at the Dunwoody Institute with approximatetly 45 members attending. After dinner a short meeting was held at which time Mr. George Wise, retiring Chairman, installed the new officers for the coming year.

The new officers are as follows: Glen Roberts, Chairman; Herman L. Sea-

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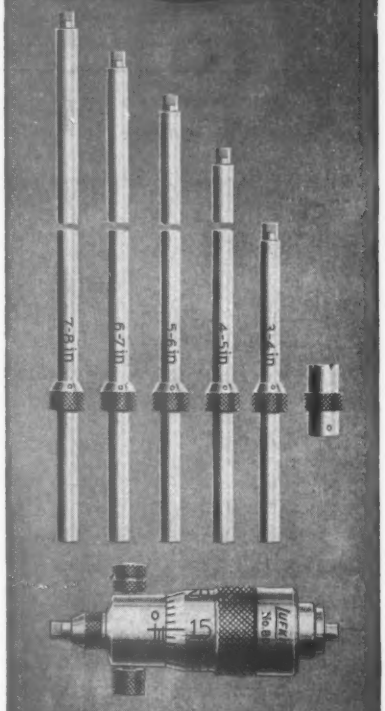

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berg, Vice Chairman; William Boker, Secretary; Fred Remmele, Treasurer.

The meeting was then conducted by Mr. Roberts, who introduced Mr. H. C. Timberlake, District Mgr. of the Defense Contract Service, whose subject was 'What the Defense Program Means to Northwest Industries." Mr. Timberlake was an able speaker and fully described the problems encountered in making their surveys.

Mr. Roberts also spoke on the development of the Twin City Chapter Study Club, and committee chairmen were appointed for the subjects to be reviewed.

The Chapter's next meeting will be held at the Dunwoody Institute on June 11.

New York-New Jersey

The regular monthly meeting of Chapter 14 was held at the Robert Treat Hotel in Newark, N. J., Tuesday, May 13. The dinner which was well attended had a surprise movie showing thrilling events, one of which was the collapse of the Tacoma Bridge. This was an innovation and one which was well received by those present.

Of the committee reports the one which held the most interest was that of the Entertainment Committee which announced through its Chairman, Charles Bazaz, that the annual picnic would take place on June 21 at Doerr's Grove, Livingston, N. J. Mr. Bazaz also announced that more than 150 prizes had already been donated and that there would be all sorts of sporting events, door prizes, eats, etc., and a royal good time for everyone.

The main event was the address by our National President, Mr. Frank Curtis, whose subject was Jig & Fixture Design and this was not only well received but the reprints of his talks as published in THE TOOL ENGINEER were eagerly taken up after the meeting, and the supply, was not enough to go around.

Ontario

The Ontario Chapter held its May meeting in the Oak Room, Union Station, Toronto, on May 9. About forty-four were present for dinner, and about eighty for the meeting.

The meeting ratified the appointment of Mr. J. H. Bruce as Treasurer to take the place of Mr. Kennard who is leaving town. The meeting also ratified the appointment of Mr. F. Schytte as Second Vice-Chairman to succeed Mr. W. A. Dawson, who is now with the Hamilton Chapter.

The report on the Educational Committee was given by Mr. Sherk following which the plans for the Annual Field Day to be held at Waterdown Golf Course on May 27 were discussed.

The speaker of the evening was Mr. Graves of the Brown & Sharpe Company of Providence, R. I. Mr. Graves spoke on the present trend of machine design and his talk was illustrated with numerous slides.

Peoria

The May meeting of the Peoria Chapter was held in the Caterpillar Showroom on Tuesday, May 6, at 7:30 P.M.

The first speaker was Mr. Paul A. Mertz of Chicago, who is on loan to the government from his regular duties as director of company training for Sears Roebuck & Company. He gave a very interesting talk on one of the vital problems of today—"Training Within Industry."

"Training the Unemployed in the Peoria Area" was discussed by Mr. S. A. Seipert of Bradley College. He is well qualified to speak on this subject as he is Director of National Defense in Peoria, Illinois.

A film from the Wright Aeronautical Corp., Paterson, New Jersey was narrated by Mr. H. E. Linsley. The film began with the first Wright plane and

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Profilometer in use in aircraft plant for measurement of finish on Nitralloy cylinder barrels after honing.

IN THE SHOP . . . next to the machines on which required finishes are being produced . . . that's where Profilometers are used to the best advantage! Because they are instruments used for production control of surface roughness, their principal value lies in being instantly available to the machine operator for checking his work as the job progresses. No needless operations are taken to secure specified finishes. It is not necessary to take parts to inspection or other departments to be tested. Rejects due to errors in meeting surface roughness specification are reduced to an absolute minimum.

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If one of the requirements in your production is to control the finishes on precision parts, there are places for Profilometers in your plant. As they are sturdily built and self-contained—requiring no electrical connections—they can be used anywhere. Direct dial readings in true inch units can be made with the part still on the producing machine.

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68" x 22' Fitchburg Lathe, Complete with centers, countershaft, 60" dia. faceplate, 4 detachable chucking jaws, power feed to longitudinal and cross feeds.

4⅜" Gridley Automatic single spindle, motor drive.

No. 2 Cincinnati Plain Grinder, 12" x 36". Complete with countershaft.

26" x 10' Bridgeford Lathe, 3-step cone, power feed both ways.

16" x 8' Walcott Lathe, GCG, 3-step cone, double back geared.

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24" x 8" Gould & Ederbardt Spur and Bevel Cutter.

No. 1 Kempsmith Universal Milling Machine, Complete with countershaft, 4-step cone pulley, steady rest.

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followed the progress of aviation to the present time.

Plans were formulated for meeting with the Kewanee group of the Rockford Chapter in June.

Philadelphia

The Philadelphia Chapter held its April meeting on Thursday, April 17, at the Engineers Club of Philadelphia. After a very good dinner, attended by 73 members, we were given a very interesting and instructive talk by Mr. Willis T. Apivey, Regional Director of Defense Training, who outlined the work accomplished by this activity and also outlined the future expansion.

Mr. Charles Crook, Jr., our Vice Chairman, gave a very good report on the progress made by students taking tool & die course at Spring Garden Institute, sponsored by Philadelphia Chapter. Mr. Crook also displayed drawings of dies and fixtures made by students of this school.

Mr. Paul Frankfurter, Sr., retiring chairman, made a plea for support of a drive for new members, which was very well received, and after a report on the financial condition of the Chapter, he installed the new officers elected at the March meeting, who were as follows: Chairman, Mr. John McMonagle; Vice-Chairman, Mr. Charles Crook, Jr.; Secretary, Mr. H. L. Simpson; Treasurer, Mr. F. M. Crayton.

Mr. McMonagle took charge of the meeting at this time and appointed the Chairmen of the various committees and also outlined briefly the program for the coming year.

Mr. D. A. Moreinis, Vice President, Continental Machine, Inc., assisted by A. M. Singer, gave an illustrated talk on "Continental Short Run Process" for making economy dies. Mr. Moreinis also displayed several tables of samples made with this type of die and some sample dies.

Ninety-five members and guests attended these talks.

Pittsburgh

Pittsburgh Tool Engineers held their regular dinner meeting on May 2, at the Penn-Lincoln Hotel, Wilkinsburg, Pennsylvania. There were fifty-eight persons present for the occasion.

After some chapter business had been given serious attention by the officers and various members, Mr. W. B. Peirce, Past Chairman, introduced Mr. Caldwell from the Rockford, Illinois Chapter of the Society, who talked briefly concerning his chapter's methods for handling various chapter functions.

Mr. Schott, Chairman of the Educational and National Defense Committee, gave some interesting facts regarding

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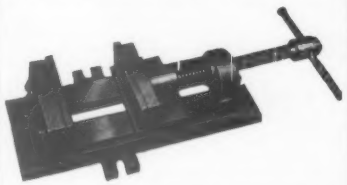

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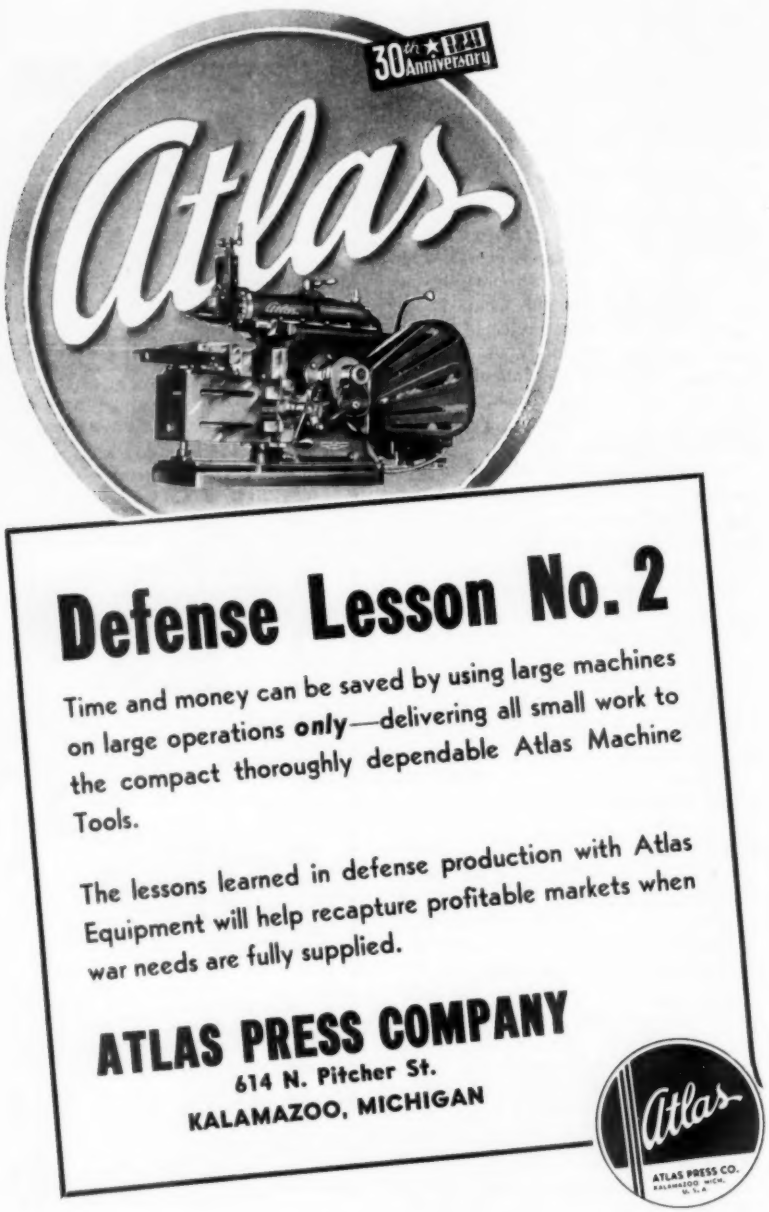
the work of his committee. Mr. C. B. Price of the Norton Company in Worcester, Massachusetts, was then introduced and after a preliminary talk on "Grinding Wheels," showed two reels of very fine colored motion pictures depicting manufacture and uses of grinding wheels. The showing of the film was very instructive and gave us a good idea of the manufacture of grinding wheels.

Rochester

The fair weather with daylight saving time cut into the dinner attendance of the Rochester Chapter May 14 meeting held at the University of Rochester, Todd, Union. Nevertheless, with the sun down a crowd of about one hundred were on hand to hear Mr. C. C. Ross, District Engr. of the Torrington Co., and the Bantam Bearing Co. talk on bearings. Particular emphasis was placed on the needle type bearing. Mr. Ross pointed out that this type of bearing was relatively new, that is, its popularity did not become apparent until about ten years ago. He stated that today no less than one million needle type bearings are produced each month. The limitations of this type of bearing such as the thrust factor, accuracy, etc, were given by him along with the many advantages. The space consideration, load superiority, ease of mounting, lubricating advantages, etc. were presented in a most instructive way by the speaker. Present day applications such as automotive, power transmission, aircraft, machine tools and others clearly indicated the success of this relatively old principle as applied in this comparatively recent bearing development. An open discussion meeting was on the calendar; so following Mr. Ross, Chairman Lucas opened this part of the evening's entertainment. The subject of screw products was introduced by Earl DeBisschop of Folmer Graflex. The Count was in good form, humor and all. He presented a number of jobs which had caused him headaches and the solutions were novel and very interesting for the listeners. Ernie Salzer of I.B.M. followed with several screw machines jobs that were "honies." Ernie contends that a screw machine man must have a loose nut or a Rube Goldberg complex to handle some of the jobs he is forced to take.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Nashville Chapter Chartered

The American Society of Tool Engineers recently chartered its forty-third chapter at Nashville, Tennessee. Formation of this chapter is largely due to the rapid industrial development in this section as a result of the Defense Program. H. T. Sprott is Chairman of the new chapter, which has forty-two charter members.

It goes without saying, however, that Ernie's examples were well presented and what he had to contribute on the subject was appreciated by all. Both DeBisschop and Salzer caused a lively floor discussion; so with the general interest, it was felt in order to encourage more such meetings.

San Francisco

The regular monthly meeting of the Golden Gate Chapter was held at the California Hotel, 35th Street & San Pablo Avenue, Oakland, Tuesday evening April 22. Dinner was served at 6:30 and was attended by approximately fifty-eight men.

Following the dinner a very interesting motion picture was shown entitled "The Fourth Kingdom" which was a history of Bakelite. The picture was very good and showed the complete development of Dr. Baekelands early experiments, up to the most modern machinery and molds for high production work.

Following the picture came the installation of new officers for the year 1941. Mr. C. W. Horack of Chapter 28, gave the members his impression of the machine and tool show in Detroit from a visitor's view point. Mr. Wallace Johnson, Chief Engineer of the Autometric Machine Tool Company, gave his impression of the same show from an exhibitor's viewpoint. Both speakers gave short but interesting talks.

The Chairman announced that the next meeting would be held on May 13 1941.

Schenectady

For the second month in succession, the Schenectady Chapter had the privilege of having one of our National Officers as its speaker. Mr. Otto Winter, first Vice President of the Society, addressed the Chapter on the subject of "Defense Training". Discussion of the most vital phase of the defense training program was enthusiastically received, for it is a problem foremost in the minds of leaders in local industries.

Mr. Winter stressed the importance of technical and mechanical training in industry today as well as the urgent need for men with this type of educational training and experience at the present time in defense industries. He also outlined the important part A.S.T.E. is taking in the Defense Training Program in the way of sponsoring training schools and furnishing teachers in areas where such training is badly needed. In this discussion, Mr. Winter paid high compliment to the type and efficacy of defense training being given in the Schenectady area.

Mr. Albert Schuneman, the new Chairman of this Chapter, conducted the business meeting and introduced the speaker. The meeting was preceded by a dinner at Howard Johnson's in Albany.

Regular monthly meetings will be discontinued until September.

Seattle

The Seattle Chapter held its April Meeting at the Veteran's Club on April 15. Sixty-five Tool Engineers and their guests were present.

Chairman W. C. Fields announced the following committees: Speaker Committee: Mr. Ainworth, Chairman and Mr. Cal Easton. Publicity Committee: Mr. Linden. Entertainment Committee: Mr. Stadium and Mr. Glenn.

Mr. Linden gave a short speech on Edison Vocation School and its courses.

Mr. Fields then introduced the guest speaker of the evening, Mr. Broderick from the Carborundum Company. Mr. Broderick gave a short speech on "grinding problems present in the Air-

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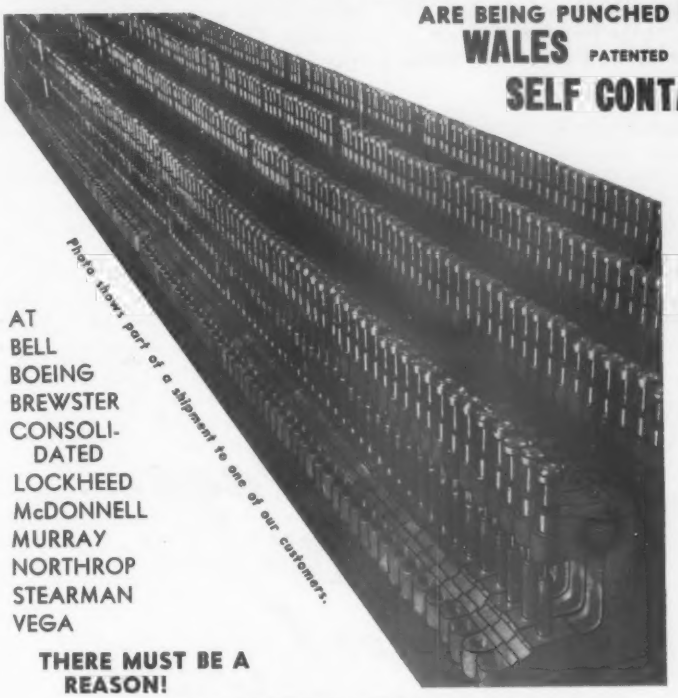

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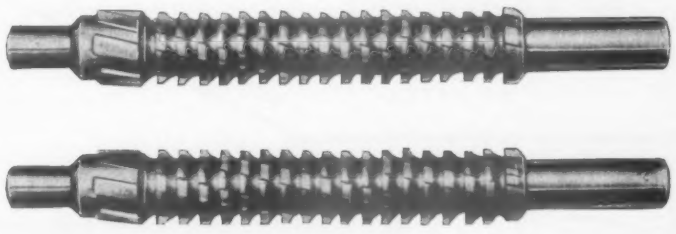

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ANN ARBOR, MICHIGAN, U.S.A.

craft industry," and then by means of pictures showed the many phases of grinding. At the end of the picture, a vote of thanks was given Mr. Broderick.

Springfield

The monthly meeting of the Springfield Chapter was held at the Hotel Bridgway, Monday evening, April 28. About fifty attended the dinner and one hundred fifty attended the technical session.

Mr. Curtis opened the meeting by giving due recognition to some ex-chairmen of our various committees. Mr. Curtis then introduced the newly elected officers which were as follows: Michael Brennan, Chairman; Edward Sheldon, Vice Chairman; Kenneth Miller, Treasurer; William Suk, Secretary.

Mr. Curtis then turned the meeting over to Mr. Brennan, the newly elected Chairman.

Mr. Brennan called on Carl Rising, the newly appointed Chairman of the Program Committee, and the latter passed around slips of paper on which the various members signified their desires as to what type of meeting they preferred for the ensuing year. There was then some discussion made as to the suitable time and place for the annual clambake, which is normally held during the month of June. It was finally suggested that this matter be taken up at the next executive committee meeting and some tentative date be set aside by said committee.

Mr. William Evarts of the E. W. Bliss Company, gave a very interesting talk on the design and use of modern punches and dies. The talk was supplemented by slides and a few reels of movies. A short discussion followed.

St. Louis

The May meeting proved to be congenial and interesting with twelve guests and sixty-three members present. Chairman Burnside presiding brought up for discussion such important events as the National Executive Meeting to be held in St. Louis in 1942, and the annual Chapter Stag Picnic. Entertainment Committee Chairman "Bigger and better time than ever" Doogan announced this year's picnic, to be held on Saturday, July 12. It is being planned for four hundred members and guests. A most inspiring letter from Detroit Headquarters was read and we thank Mr. A. H. d'Arcambal.

Following individual introduction of guests, the formal meeting was closed and Mr. G. E. Braumbach entertained the Chapter with slides and educational talk on Tool Steel Developments, bringing out four factors controlling correct tool steel application: 1. The Tool Engineer. 2. Good workmanship. 3. Proper selection of tool steel. 4. Correct heat treatment.

Syracuse

The Syracuse Chapter held its May meeting at the Syracuse Industrial Club on May 13.

Mr. R. O. Beardsley, Mgr. & Engr., Optical Comparator Div., of Jones & Lamson Machine Company, Springfield, Vt., addressed the Chapter. His topic for the evening was "Measuring and Inspection by Projection." Optical comparators, he said, are being employed more and more in the inspection of small parts such as threads, saw teeth, latch points, needles, lathe tools, gear teeth, and a miscellaneous variety of small parts. Some of these parts are difficult to check by direct gaging and optical gaging furnishes the solution. These were the principal points that Mr. Beardsley brought out in his talk which was supplemented by slides showing related applications of the instruments. During the question period, which followed, it appeared that John Moffitt of Auburn Spark Plug Company had many problems for which optical projection

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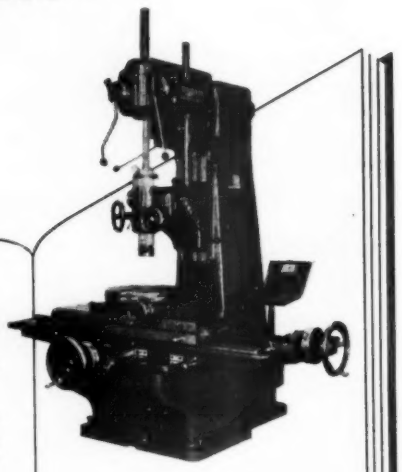

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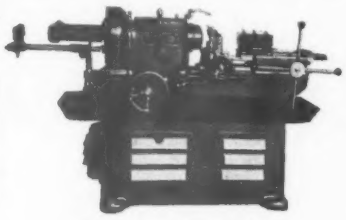

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would be the answer. Johnny Moffitt is the hard working "bull of the woods" at Auburn Spark, a fast growing screw machine products concern. His letters to his vendor friends are masterpieces of humor that put J. R. Williams, originator of the aforementioned "bull of the woods" in the shade.

Among those present at this meeting, we noted were E. R. Quade of Precision Casting and Mr. Detterbeck of Banner Mfg. from Chicago. We welcome guests from the Syracuse area and out of town visitors.

The business meeting of this month was brief. The Chairman told of the plans for the semi-annual A.S.T.E. Meeting to be held in Toronto, Canada. He announced that the annual clambake was again to be the first event on the calendar next fall. A discussion occurred regarding the June Meeting of the Chapter. It is planned to journey to Auburn, N. Y. if arrangements can be made with the help of our Auburn members.

Worcester

The last business meeting was held on May 12 at Putnam and Thurston's preceded by a dinner at which 106 members and guests participated. The Entertainment Committee had some very good music to accompany the dinner and they should be complimented on the job they are doing.

The Chapter was honored with the presence of Mr. Walter B. Dennen, head of the Worcester Boy's Trade School who made a few remarks and stressed the point that the Trade School is willing to cooperate with the Tool Engineers and it is up to the Tool Engineers to let them know just what type of work they should stress mostly. He also spoke about sending young high school graduates, with mechanical aptitude and not in a position to go to any technical college, to the Trade School for preliminary training.

The Chapter was also honored with the visit of Mr. Lockwood, Chairman of the Boston Chapter and Mr. Geddes, Vice Chairman, also Mr. W. Young, Secretary of the Boston Chapter. Mr. Cook from the Springfield Chapter was there and the surprise of the evening was a visit given us by Mr. Ed Taylor, our former Chairman who had with him Mr. Bill Schmidt of Heald Machine Company. Springfield, Vermont, and Hartford Chapters were also represented, and during the dinner Mr. Frank Curtis, speaker of the evening, was introduced, and as the National President of the Tool Engineers, he made a few remarks telling of the growth of the Tool Engineering Society from 1932 when it started in Detroit and up to date where

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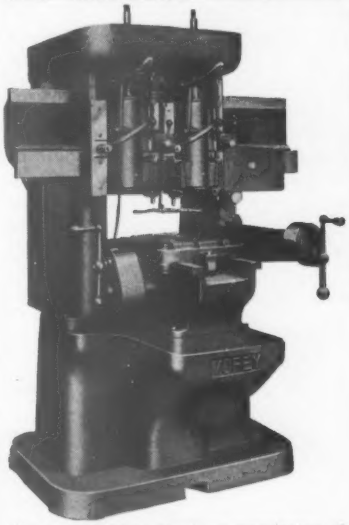

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it has now 43 Chapters, approximately 7000 members and before the year is over, the membership is expected to come up to 10,000.

The dinner over, Mr. Curtis gave a fine talk on jigs and fixtures illustrated with slides showing the improper and proper way in which they are used and also some practical illustrations of them in use. He explained how the Tool Engineers have to adapt themselves to a broad field of engineering starting with machine tools, then jigs and fixtures and then the cutting tools. Mr. Curtis knows his subject and has a way of putting it over so that you just cannot help getting information out of his lecture. There were many guests present, and the Chapter felt that Frank got them some new members.

Mr. Lindegren, the new Chairman, took over for the first time and did a fine job. He mentioned that the Hartford Chapter was to have an outing on May 21 and the Boston Chapter June 21 to which all were welcome.

Questions were answered by Mr. Curtis after the lecture, and a vote of thanks was extended to Mr. Curtis for a very instructive and interesting evening.

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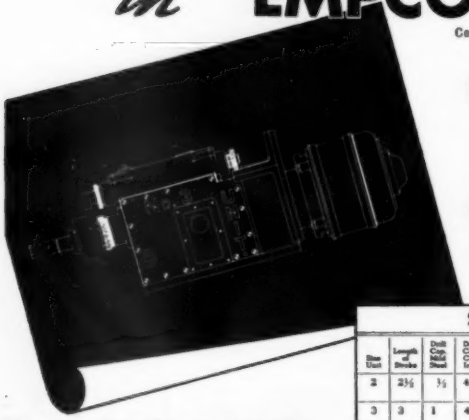

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SPECIFICATIONS

Size Unit	Length of Stroke	Size Hole Steel	Size Hole Cast Iron	Size Hole Brass	Motor Size	Spindle R.P.M. 1750 Motor	Spindle R.P.M. 1150 Motor	Rev. of Spindle To Close of Cam
2	2½	½	4-⅝	4-⅝	½ to 1	Max. 3800 Min. 110	Max. 2300 Min. 80	Max. 900 Min. 30
3	3	1	4-⅝	4-⅞	1 to 3	Max. 3800 Min. 110	Max. 2300 Min. 80	Max. 800 Min. 30
4	5	1	4-⅝	4-⅞	1 to 3	Max. 3800 Min. 110	Max. 2300 Min. 80	Max. 800 Min. 30
5	8½	1½	10-⅝	6-⅞	5 to 7½	Max. 2625 Min. 110	Max. 1725 Min. 80	Max. 800 Min. 30
6	6	3	20-⅝	12-⅞	5 to 10	Max. 2625 Min. 110	Max. 1725 Min. 80	Max. 800 Min. 80

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This unusually high production is made possible through the specially designed cam. Operating cycle cut one third.

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THE Passing Parade

Clarence F. Bennett, Chairman of the Board of Directors of The Stanley Works, New Britain, Conn., was recently feted by company officials and friends in honor of his fifty years with the company. He went to work in the shipping room in 1891 at the age of 19. He soon entered the production department and at the age of 25 was production superintendent. He became a director in 1912 and president of the Company in 1923.

Stanley's Bennett
Fifty years from shipping clerk.

Last March he was succeeded at this post by R. E. Pritchard and himself became Chairman of the Board.

George Eglinton has accepted a position as vice president with Charlesworth, Inc., Cleveland. Mr. Eglinton was formerly vice president and general manager of the Lincoln Park Tool and Gage Company, Lincoln Park, Michigan.

Don T. Flater, formerly works manager of the Chrysler-Jefferson plant has been appointed general staff master mechanic of the Chrysler Corporation, Detroit. He replaces F. J. Morisette who has been placed in charge of the Chrysler gun arsenal.

Effective June 2, 1941 the name Morrison Machine Products Division of Hardinge Brothers, Inc., Elmira, New York, will be discontinued and all business carried on under the name of Hardinge Brothers, Inc.

A. C. Haberkorn Machinery Company has been formed in Detroit. Offices have been established at 412 New Center Building. The company will represent, exclusively, Kent-Owens Machine Company, Minster Machine Company, Ohio Units, The Tomkins-Johnson Company,

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Supplied For ALL OF THESE MACHINES

Modern Collet's parts service is "all-inclusive". When any part requires replacement, regardless of the type of screw machine on which it is used, you can be sure that it can be supplied by this company. You enjoy the benefits of one convenient source of supply . . . you get parts which, in every case, always equal or excel the parts they replace. Get in touch with your Modern Collet representative or write directly to the factory.

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—PASSING PARADE—

Chas. Grotnes Machine Works. In addition they will also be agents for Tuthill pumps in Detroit area. A. E. Francisco and W. C. (Bill) Maier are connected with the new firm.

The Detroit Ball Bearing Company has extended their operations by the establishment of a new branch at 127 South Water Street, Saginaw, Michigan.

Frank K. Ziegler will handle the complete line of Upton Electric Salt Bath Furnaces in the Chicago area.

A. H. Frauenthal, vice president and general manager of the Bantam Bearings Corporation, South Bend, has tendered his resignation. He is leaving to establish a new factory in Muskegon, Michigan to manufacture large special roller and ball bearings, as well as aircraft parts. R. B. Nichols, secretary and sales manager, succeeds to Mr. Frauenthal's position.

Sherman Barnes has been placed in charge of the western New York territory of Ampco Metal, Inc. He will make his headquarters in Rochester.

L. Clayton Hill has been appointed vice president and general manager of Murray Corporation of America, Detroit.

Murray's Hill
He is a practical man.

A graduate of the University of Michigan, Mr. Hill has had extensive practical experience in both the automotive and aircraft industries. He has been vice president in charge of manufacturing at Murray.

Howard M. Dawson has been transferred to the Detroit office of the Jessop Steel Company. He has been located in Cleveland.

The H P L Manufacturing Company, Cleveland, has recently been established. The company will specialize in stampings of metal, fiber, and other sheet materials in quantities from 25 to 5,000 pieces.

James D. Milne, Pittsfield, for 29 years an employe of the General Electric Company, has been appointed manager of the Fort Wayne, Ind., division of the company's plastic department, ac-

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Capacity ½" holes through $\frac{3}{16}$" steel; $\frac{13}{32}$" through ¼" steel. Can also be made for holes up to ⅜" in thinner metal. Stock punches and dies available from $\frac{1}{16}$" to ½" by 64ths.

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There's a Gusher model to fit your needs.

P-3 is available in external right or left discharge models, flange-mounted and immersed models.

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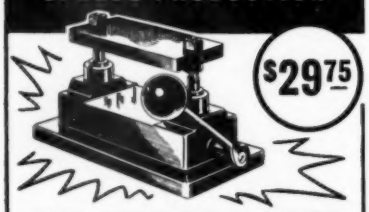

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—PASSING PARADE—

cording to G. Harry Shill, manager of the department. He will be in charge of all engineering and manufacturing in the Fort Wayne division, succeeding Joseph C. Miles, who has been named supervisor of planning and wage rates in the specialty fraction horsepower division of the General Electric Fort Wayne works.

James Y. Scott, president and treasurer of the Van Norman Machine Tool Co., has declined an opportunity to become coordinator of the machinery division of the Office of Production Management in Washington. His business responsibilities are such that he cannot accept the invitation, Mr. Scott said.

John J. Toth, recently general superintendent at the plant of the H. & B. American Machine Co. at Pawtucket, R. I., has purchased the Bridgeport, Conn., branch of the New England School of Practical Training and will operate the same in connection with the Toth Engineering & Tool Co., Bridgeport. Mr. Toth, personally, will conduct the consulting engineering division.

Lawrence W. Howe, who has been associated with the firm for five years, has been named vice president and general

Lincoln Park's Howe
He becomes general manager.

manager of the Lincoln Park Tool and Gage Company. No changes in the company's general policies are contemplated.

Frederick Pyne, planning engineer with the Van Norman Machine Tool Company of Springfield is assisting in the production division of the office of Production Management in Washington. He is in the planning department of the machine tool section, working under Howard Dunbar, former general manager of the Norton Company of Worcester, who is technical chief of the section.

Died

Robert Frederick Herrick, Jr., 47, New England industrialist, died May 1 after a brief illness. Herrick was vice president of the Essex Wire Corp. of Detroit, Mich., the Reed-Prentice Corp., Worcester and Scott & Williams, Inc.

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For speedier, more economical finishing of small metal and plastic parts...

Finishing • Polishing
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Equipped with single or 2-speed motor; exclusive, automatic brake; spring-type hand-operated collet, or step chucks, expanded mandrels.

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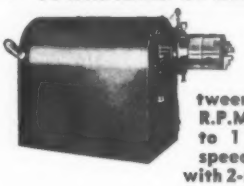

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CARBIDE TOOLS

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BUILT BY MOTOR SPECIALISTS

of Laconia, N. H. He was also a director of the American Felt Co. the Manufacturers Co., Anderson-Meyer and Co. Ltd. of China, The Saco-Lowell Shops, and the Daniel Green Felt Shoe Co.

Major Eugene F. Russell, 75, former secretary of the Manufacturers Association of Connecticut, died recently at Cape Cod Hospital, Hyannis, Mass. He had been general manager of the Locomobile Company of America, in Bridgeport, until 1913. During the World War he served as a major in the Ordnance Department of the Army.

George R. Munschauer, 61, president of the Niagara Machine & Tool Works,

George R. Munschauer
Served faithfully for 44 years.

Buffalo, died recently. He had been with the company for 44 years and had served as president for 23 years.

Frans H. C. Coppus, 60, of Princeton, president and treasurer of Coppus Locomotive Equipment Co. and chairman of Board of Coppus Engineering Corp., died recently in City Hospital after an illness of more than two months. Born in Holland, he received his education there and at 21 went to Germany to gain practical experience in the machine shops. In 1902 he came to the United States and obtained positions in New York City and Pittsburgh. Later he went to Worcester and entered the employ of Crompton & Knowles Loom Works. He invented the automatic shuttle replenishing device to box looms and sold the idea to the Crompton company. In April, 1909 he went into business for himself as a combustion engineer, and following the invention of the Coppus turbine blower in 1911, he founded the Coppus Engineering & Equipment Corp. for its manufacture.

J. Watson Owings, 56, metallurgist on the staff of the Meehanite Metal Corporation, Pittsburgh, died recently in Spokane, Washington. He had been with the company since 1936.

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Drills more holes per minute.
Drills holes from 1/32"—in some metal to 3/8".
Used singly or in multiples.
Mounts on any angle.
Has in-built brake.
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150% LONGER LIFE

Rigid tests on snagging and exacting operations prove they have 150% to 300% longer life. Won't ridge on welds, sharp corners, sinking dies, barbering, etc. There's a shape and size to handle every grinding job faster, better, at lower cost.

FREE MOUNTED WHEEL CHART
For ready shop reference. A wall chart 22" x 15" showing actual size and shape of every standard Chicago Mounted Wheel.

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BOSTON—June 12. Dinner 6:30 P.M. Session 8:00 P.M. Massachusetts Institute of Technology. Mr. H. M. Richardson, Chief Engineer of Development, of the General Electric Co. will speak on the subject of Plastics.

DAYTON—June 9. Hotel Gibbons, Mr. Chas. R. Hook, President of the American Rolling Mill, will be the speaker for the evening.

MILWAUKEE—June 12. 7:30 P.M. Republican Hotel. Mr. Karl Kuehn will talk on the subject of Hand Hydraulics and the Origin of Hydraulics.

PITTSBURGH — June 6. 6:30 P.M. Penn Lincoln Hotel, Wilkinsburg, Pa. The subject Salt Bath Furnace Practice will be presented by the Ajax Electric Co.

RACINE—June 13. Afternoon and evening. Meadowbrook Country Club. Master of Ceremonies for the 6th Annual Frolic will be Mr. Rex Reynolds.

ROCKFORD — June 14. 10:00 P.M. Morgan Park Golf Course. Golf Stag. Reservation: R. M. Ramser, 615 Auburn Street, Rockford, Illinois.

ST. LOUIS—June 12. 6:30 P.M. Melbourne Hotel, Grand & Lindell.

SOUTH BEND—June 14. 10:30 A.M. to close of the day. Elkhart Country Club, Elkhart, Indiana. Features are golf tournaments at 1:00 P.M., games, contest, etc., with prizes for each contest.

TRI-CITIES—June 4. 6:30 P.M. Kewanee, Illinois. Reservation: L. J. Rodgers, c/o Deere & Mansur Works, Moline, Illinois. A tour of inspection through the Walworth Company will be conducted in the afternoon of June 4th.

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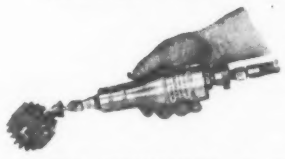

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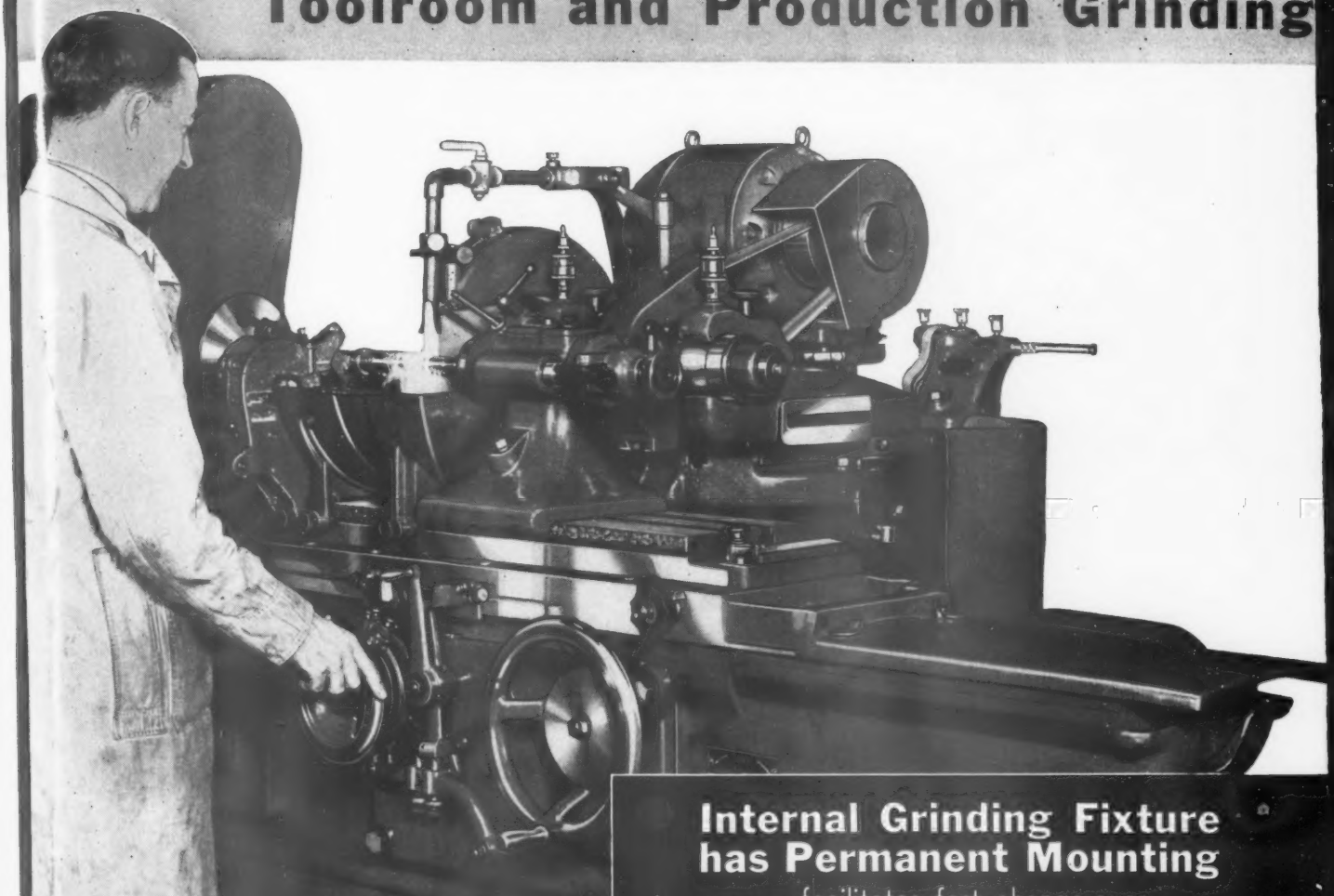

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